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Old Routes, New Trails: Contemporary Inuit Travel And Orienting In Igloolik, Nunavut

by

Claudio Aporta

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the

requirements for the degree of Doctor of Philosophy

Department of Anthropology

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Eric Higgs

Clifford Hickey

Milton Freeman

Edward Cornell

Ludger Müller-Wille

Date approved: 16 June, 2005

Abstract

Despite profound social and economic changes, traveling on the land and the sea still plays a very significant role in the lives of the Inuit of Igloolik, in the territory of Nunavut, Canada. For Inuit hunters, traveling implies a comprehensive understanding of and a thorough engagement with the environment in which they live. In this context, orienting means more than locating one's geographic position or one's destination in abstract space. The activities and skills involved in orienting and wayfinding are embedded in a particular way of approaching the territory and of understanding people's place in it. This thesis studies different aspects of the Inuit approach to traveling and orienting, and some characteristics of their knowledge of the territory. It also describes how Inuit hunters in Igloolik relate to the sea ice and how they break trails on fresh snow, recreating routes (or courses) that have been part of the community's memory throughout many generations. Finally, it analyzes the changes brought up by a contemporary setting, and discusses the use of Global Positioning System (GPS) receivers by Inuit hunters in the context of a theoretical debate around technology and change

A Orlando Aporta y Teresa Mari, por su amor de padres y sus enseñanzas de vida.

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This project would have not been possible without the support of John MacDonald, in Igloolik. Himself a student of Inuit navigation and astronomy, and a long-term resident of Igloolik, he was a key person in providing logistic support and intellectual motivation in Igloolik, and in linking me with several hunters and families in the community. Several aspects of this research developed through long conversations with John. He provided insightful feedback on every chapter, and discussed the most conflicting issues of my papers with Inuit in Igloolik.

Several ideas also developed through conversations with Theo Ikummaq, George Qulaut, Terry Iyerak, Joe Iyerak, Leah Uttak, and Louis Tapardjuk. I found in Louis Alianakuluk a permanent source of knowledge, and a very articulated speaker. His contribution made possible the writing of chapters 3 and 4. Special thanks to Maurice Arnatsiaq and his family for making me feel welcomed in their house and for sharing so many good moments on the land. Special thanks to all the people I interviewed in Igloolik, and to the Inullariit Elders Association for showing their appreciation for this research project. Thanks to Jack Hicks for his hospitality in Iqaluit.

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Chapter 1: Introduction

Traveling in the Igloolik region of the eastern Canadian Arctic (Nunavut) presents distinctive challenges, such as extreme weather conditions, relatively indistinct topography, and moving ice. Inuit hunters usually use neither maps nor compasses, but knowledge and technique based on the characteristics of snowdrifts, wind direction, astronomic phenomena, ice movement, animal behaviour, landmarks, and place names. Topographic maps have become more popular in recent years, and Global Positioning System (GPS) units have come into use in the late 1990s.

In this dissertation I describe the knowledge and skills Inuit hunters of Igloolik use when traveling and orienting on the land and the sea. I also analyse old and new patterns of travel, problems in inter-generational sharing of geographic knowledge, and the effects of GPS in Inuit wayfinding methods. Wayfinding skills in Inuit culture do not comprise a discrete body of knowledge that can be systematically taught and learned in a formal setting. Inuit traveling, hunting and survival knowledge and techniques are interrelated and are transmitted through observation and performance. For younger generations born in permanent settlements (since 1959 in the Igloolik region) a great deal of time is now spent at school and in part-time jobs. Recreational activities have changed significantly with the arrival of electronically-mediated entertainment (television, videos, videogames) and new transportation technologies (ATVs, snowmobiles, motorized boats).

Igloolik offered ideal conditions for a study of wayfinding. The relatively low topographic features of its surroundings make wayfinding and bearing-keeping a challenge, and the sea-current activity of the Foxe Basin creates a particular environment that is both attractive for sea-mammals and challenging for people wanting to hunt, travel and reside on the sea ice.

Figure 1-1: Geographic location of the hamlet of Igloolik

There is also extensive written documentation of ethnographic value about Igloolik, starting in the 1820s. Valuable data on land use patterns and traveling methods among the Inuit of Igloolik are found in Lyon's and Parry's reports of their expedition in search of the northwest passage (Lyon 1823, Parry 1824). Reports published by members of the Fifth Thule Expedition (1921-24), especially Mathiassen (1924), bring light to the changes of Inuit traveling patterns after the intensification of whaling activities and

trading in the regions of Repulse Bay and Northern Baffin Island. Between Parry's voyage and the Fifth Thule Expedition, there were only two outside visitors in Igloolik: Charles Francis Hall in 1867 and 1868, and Albert Tremblay in 1913; neither of them provided relevant ethnographic information of the land use patterns of the Iglulingmiut in their reports (Hall 1864, Tremblay 1921). Igloolik has been the focus of considerable anthropological research over time, including the studies of Damas (1963), Mary-Rousselière (1984), and, more recently, Rasing (1994) and Rowley (1996) [1]. The studies of McGhee (1984), Maxwell (1984), and Rowley (1940) help recreate the history of occupation of the region, and the context of mobility and residence patterns before the ancestors of the contemporary Inuit occupied Igloolik. Crowe's study on cultural geography offers a detailed description of the geographical situation of Igloolik, and Freeman (1976) and Riewe (1992) present excellent overviews and geographic records of the land use activities in the area. As regards oral history, Igloolik possesses an invaluable source of information collected through the Igloolik Oral History Project[2]. Finally, the recently published work of MacDonald (1998) on Inuit astronomy and Inuit navigation in Igloolik was an excellent starting point for my own studies.

How the project evolved

The idea for this research developed initially as part of an MA project at the Anthropology Department of the University of Alberta, which I started in the Fall of 1997. I was originally interested in how communication and transportation technologies affected people's perception of time and space. The focus of the Master's project, as it was first envisioned, was an analysis of GPS technology and its influence in Inuit traditional methods of navigation.

During my first trip to Igloolik, in the summer of 1998, I realized that the proposed research issues were far more complex than those I had foreseen. First, there were

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[1] Rowley's book was not meant to be an ethnographic study of the Iglulingmiut, but it contains a lot of first-hand information of ethnographic value.

[2] The Igloolik Oral History Project is a collaborative, on-going program run by the Inullariit Society of Igloolik and the Igloolik Research Centre since 1986.

different ways in which hunters were using GPS, and it was impossible to establish a cause-effect connection between GPS (or any other technology, for that matter) and changes in traditional knowledge. Second, it was hard to identify the characteristics of "traditional" Inuit navigation. Experienced hunters in Igloolik were knowledgeable snowmobile drivers, and they had been, from their youth, involved in trading and trapping activities. Those characteristics did not seem to affect the "Inuitness" or their knowledge and skills to travel and orient. Finally, navigation was not a word in the Inuktitut language and, most importantly, was not a concept clearly identified by most hunters I met in that first trip. These difficulties seemed at first like a drawback in my research plans, but in the end they were decisive in shaping a more comprehensive project, which aimed to describe how Inuit hunters in Igloolik related to their environments. Given the larger scope of the research, and upon my supervisor's advice and the consent of the Anthropology Department, I undertook this project as a doctoral student, beginning in the fall of 1998. Since then I have carried out seven more months of field research in Igloolik in the course of three trips during the fall-winter 2000, winter-spring 2001, and summer 2002.

Methodology

Of all the methods applied in this research, participant observation was the most valuable and the most frequently used. It proved to be the best way to approach a study of Inuit traveling and orienting. I traveled with several hunters (Eugene Quluaq, Cain Iqaqsaq, George Qulaut and Maurice Arnatsiaq). My main travel companion was Maurice Arnatsiaq, through an arrangement made with the Igloolik Research Centre (IRC). Arnatsiaq, an experienced hunter in his mid-fifties, always traveled with members of his family. During summer trips we were sometimes accompanied by most of the members of his nuclear family, and one of his sons or sons-in-law always participated in our snowmobile trips.

The aim of most long-distance snowmobile travel was related to caribou hunting. The patterns of the sea-ice freeze-up played a role in choosing travel destinations and routes. Most hunters in the community shared our travel destinations, and we almost always shared shelters with other Inuit from Igloolik or the neighbouring community of Hall Beach. Traveling and camping with other hunters were among the most valuable experiences during my stay in Igloolik. Camping was the best setting to hold long, informal conversations with hunters of different backgrounds, levels of knowledge and skills.

Some hunting trips (e.g. sealing) involved short-distance travel around the settlement and were performed in one day. Other trips required as much as 10 days outside the settlement. The trips included situations such as crossing of very rough sea ice, traveling across thick layers of fresh snow, traveling during blizzards, and dealing with mechanical problems. Some trips involved up to 18 hours of almost continuous driving. I traveled a total of approximately 3000 km during my several seasons in Igloolik. Some snowmobile trips included the revealing experience of trail-breaking, which is one of the focuses of Chapter 4. On only one occasion I was forced to use my GPS receiver as a main navigational instrument, during a fishing trip with an Inuit teenager off the island of Saglarjuk. Otherwise, the trips were led by experienced hunters using the methods that I describe in Chapter 5.

A total of 20 formal interviews were carried out among hunters of different age groups. Two relatively unsuccessful interviews with elders prompted me to ask the interpreter Louis Tapardjuk to conduct some of the interviews by himself. The interviews I had previously conducted did not satisfy my expectations because the elders would frequently downsize the level of information when I was present[3]. While this is something most researchers face at one point or another when interviewing Inuit elders, the nature of the information I was collecting (e.g. spatial terms or descriptions of routes) made this a critical point. A well respected member of the community, Tapardjuk was an astute

interviewer, with whom I held long conversations before the interviews to set up the tone and the direction of the questions.

The interviews of the Oral History Project were an invaluable source of information. The interviews can be accessed in three ways: by listening to the Inuktitut audio-tapes, by reading the translations or transcripts, or by viewing the files on a computer monitor. The latter method is preferred when searching for specific information, since it is possible to locate references to a given topic occurring in the entire collection. Some of the most significant data I found in the database came from recordings of conversations between two elders, interviews conducted by younger Inuit, or elders' self-recorded monologues. This material contained information about perception of space, description of routes and journeys, and use and meaning of place names. Personnel from the Igloolik Research Centre and other Inuit friends helped to interpret intricate language issues, that resulted in the production of different lexica (see appendixes) and in the mapping of journeys and stories.

One of the most important methods applied in this research consisted in the combined use of GPS, GPS mapping software and ArcGis. From the beginning it was clear that mapping was going to be an important aspect of the project, and I was surprised at the possibilities that GPS offered for recording spatial information (movement, turns, stops, errors, etc.) during actual travel. The GPS mapping software *Fugawi* permitted an easy and attractive interface between the GPS and the topographic maps stored in my laptop computer. It soon became evident that this was a basic, inexpensive, and easy way of working with digital geographic information. The geo-referencing of routes, placenames, stories, and other geographic information was done following various methods that are explained in Chapter 2. This geographic information was enhanced at a later stage through the use of GIS (geographic information systems) software (ArcGis), which allowed more complex ways of analysing and representing the information. A revealing experience, that allowed me to develop a much better understanding of Inuktitut place

[3] In their narratives of journeys, for instance, the elders frequently omitted spatial terms or place names, scaling down their answers to what they assumed to be my knowledge of the local geography and specific

names, was a survey of over 60 named places around Igloolik island that were recorded with a GPS on location and documented with a digital camera. This project was supported by the IRC.

Logistics were coordinated with the IRC, which provided housing and working facilities while I stayed in the settlement. Boat and snowmobile trips were most frequently organized by the IRC, which also made available a snowmobile for all my trips.

The only significant limitation during my field research was related to the fact that I am not an Inuktitut speaker. A lack of funding at the beginning of the project made it difficult to take formal Inuktitut training in Iqaluit, and some informal attempts in Igloolik were not very productive. I learned numerous expressions, terms and place names in Inuktitut but, regrettably, I never became adroit with the language[4]. Many people in the community are bilingual and I was always able to communicate in English. The project would have been certainly improved had I been fluent in Inuktitut. However, I do not believe this seriously affected the results of my research, perhaps because of the excellent work on terminology I was able to engage in with the IRC staff and other Inuit friends.

Unexpected findings

Two aspects of the way Inuit relate to their environment became important foci of this project, even though they had been merely mentioned in my original research proposal.

Understanding of the sea ice. The settlement of Igloolik is situated on an island of small proportions and practically all hunting and fishing requires interacting with the sea. There is ice all year round in Igloolik, if one considers the floating ice that the tides and the

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Inuktitut terms.

[4] I am a native Spanish speaker, and I am quite fluent in French, but I found Inuktitut very hard to learn without a minimum basis of formal training.

winds bring back and forth across the coast in the summer. Sea-ice traveling and hunting are performed during eight months of the year, and until the 1940s people used to have their spring camps on the sea ice. The sea ice is a very dynamic environment that goes through different stages from freeze-up to break-up. Travel routes must deal with these processes, and trips sometimes require long detours as hunters seek safe travel surfaces. What surprised me the most was the fact that the changing nature of the sea ice is understood by Inuit hunters to a degree that its dynamics become predictable. Due to the combined action of several factors, the patterns of the sea-ice annual processes are recurrent, and by the time the sea ice stabilizes some important ice features appear at the same locations year after year, constituting a familiar *topography* of the sea ice. Some of these features have names similar to the names that Inuit give to land features. What also impressed me was the extensive history of occupation that some of these places on the ice have. The ice camp in the vicinity of the ice ridge known as Agiuppiniq, for instance, is remembered by elders who have vivid memories of their lives on the ice, and is also mentioned by the first Europeans to visit Igloolik, explorers Parry and Lyon, in the 1820s. Such history of occupation is not only related to the more permanent landfast ice, but also to the ever changing moving ice. The use of such changing environments in Igloolik is only possible through the understanding of complex environmental factors such us tides, astronomic observations, winds, submarine topography, and a comprehensive knowledge of the Fury and Hecla Strait and the Foxe Basin.

Trails, routes and tracks: It is possible to establish the historic continuity of routes from multiple sources, including interviews, oral history, and the notes and maps of explorers and ethnographers. Trails go through the same locations year after year. One of the main characteristics of arctic trails is the fact that they totally or partially disappear from the landscape every season and sometimes within the same season. Trails must be broken once and again on trackless snow, but most of them follow old, well-established courses. Routes, therefore, are permanent features of Igloolik hunters' memories, but trails (made of tracks) are ephemeral. What fascinated me was how these courses are remembered, recreated and described. Breaking trails struck me as a very important aspect of the Inuit relationship with their environments, and yet I was surprised to see how little had been

written about it. I also realized that GPS was a very useful instrument in studying the spatial characteristics of trails, simply because I could map them while traveling as long as I set the GPS unit in *tracking* mode.

About the essays

During a meeting with my committee held after the third trip to Igloolik, it was decided that the dissertation would be written as a series of essays. The essays are interconnected, following an outline that goes from the description of the methodology (Chapter 2), through the description of specific aspects of Inuit environmental knowledge (Chapters 3 and 4), to the more general issues of Inuit wayfinding and technology (Chapters 5 and 6). Chapters 3, 4 and 5 were shortened for submission to academic journals. Here I present the original full-length versions. Some of the content of the papers is redundant because in each of them I had provided, for instance, a background of Igloolik and an outline of the research project and methodology. However, the chapters are better appreciated as parts of a whole.

Chapter 2 is a reflection on the use of GPS mapping software and GIS software to map indigenous knowledge and land use patterns. It was submitted to the journal *Arctic* in November 2001, and formally accepted for publication in December 2002. It describes the methodology used to map place names, stories, narratives of journeys and trails in Igloolik, and offers some preliminary results from my research mostly as illustrations of the possibilities of the method. One of the main claims of the paper is that this method is highly suitable for community-based mapping projects because it avoids dealing with expensive and complex GIS software during a significant part of the process. It also speeds up the painstaking task of manually geo-referencing each place name or geographic feature to be mapped. Since then, the methodology has been implemented by the Inuit Heritage Trust to map place names in the community of Taluqruaq (former Spence Bay, Nunavut), and I have been contracted by this organization to provide training to Inuit from the Keewatin region whose communities may also use this method

to map their place names. In Igloolik, one of the results of the application of this method was the creation of a place names database, which I presented to the Inullariit Elders Association in March of 2001.

Chapter 3 focuses on the knowledge and skills involved in the way Inuit in Igloolik use and understand the sea ice. This paper was submitted to the journal *Polar Record* in February 2002 and published in October 2002 (*Polar Record* 38 (207): 341-354). One of the results of the research on sea ice was the development of a database of ice terminology and a geographic database of named places on the sea ice that I show in Appendices 1 and 2. This paper was presented in the workshop *Memory and History in the North*, at the Manoir du Lac Delage, Quebec, and it benefited from other participants' feedback, especially from students and faculty of the Nunavut Arctic College (based in Iqaluit) who were involved in the workshop.

Chapter 4. Inuit hunters in Igloolik enjoy talking about travel and journeys. I was surprised to see that people could remember routes that they had followed many years before, and that they could still recall minute details of the trails' surroundings. The descriptions of routes always took place within the narrative of journeys, because it is through the journey (physical or narrative) that Inuit experience the territory. I obtained some important information for this paper just by asking a hunter to describe a particular journey. This simple question sometimes took hours to discuss. Every detail from animals that were spotted along the way to how a snowmobile began to fail and how it was fixed, were part of the answers. While plotting routes on the mapping software (some of them downloaded from my GPS and recorded from actual travel, and others drawn by hunters on paper or digital maps), it became evident that there was a clear relationship between place names and routes. In other words, routes on the maps were surrounded by named places. By the same token, in the narratives of journeys, routes were described as going from a named place to another named place, and turning points were sometimes described as places where a certain named feature was visible. A "side-product" of the writing of this chapter was the compilation of numerous terms indicating direction of

travel, the act of traveling, and spatial referents (Appendix 5). This paper was submitted to the journal *Études/Inuit/Studies* in December 2002, and accepted in March 2003.

Chapter 5 is the most comprehensive essay of this dissertation. Most of the topics and issues discussed in the previous papers are articulated in the larger context of how Inuit of Igloolik relate to their environments while traveling and orienting. One of the main contributions of this paper is the description of how Inuit travelers use and describe horizons and how they describe the precise location of specific places without the use of maps or other visual representational aids. In this chapter I touch on some complex theoretical issues such as perception of space, the meaning of being lost, and the relationship between the concepts of place and space. This paper was submitted to *Transactions of the Royal Geographic Society*, in March 2003.

Chapter 6 describes the use of GPS receivers by Inuit hunters in Igloolik and analyzes the potential changes that this instrument may provoke in Inuit orienting methods. This case-study is used as a starting point to debate past and current theoretical definitions of technology, and to propose an approach based on recent developments in the subfields of anthropology and philosophy of technology. This chapter inquires into the relationship between the introduction of new technologies and social change, and suggests that technologies must be understood in larger social, economic and political contexts, and in relation to a broader pattern of 'taking up with the world' that we call (following philosopher of technology Borgmann (1984)), the device paradigm. One of the main questions raised in this paper is whether some technologies (e.g., GPS) significantly affect people's relationship with their environments. Chapter 6 benefited from fruitful collaborative work with Eric Higgs, whose expertise in the fields of philosophy of technology and environmental studies, greatly improved my research observations and approach to the topic of technology. We intend to submit this essay to *American Anthropologist*.

Chapter 7 presents a summary of the topics covered in this thesis, places orientation and the knowledge of the territory within the broader relationship that Inuit hunters establish with their environments when they travel, and proposes directions for further research.

A note about place names

Communities across Nunavut are now known with their official Inuktitut names. Arctic Bay, for instance, is Ikpiarjuk, Repulse Bay is Naujaat, Pond Inlet is Mittimatalik, and Hall Beach is Sanirajaq. Most previous ethnographic and historic material, however, used the names that appear in most official maps of Canada. The spelling of Inuktitut names vary in older interviews and literature. To avoid confusion, names such as Repulse Bay, Arctic Bay or Clyde River, have been used throughout most of the text. Names of local features are given in their Inuktitut version. The spelling "Igloolik" has been used when referring to the island and the settlement, and "Iglulik" when referring to the camp southeast of the current settlement.

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Chapter 2:

Using GPS mapping software

to plot place names and trails in Igloolik[5]

During investigations of social and technological changes of wayfinding techniques among Inuit hunters of Igloolik (in the territory of Nunavut, Canada), the importance of place naming in the perception, narratives, and use of their territory became very apparent. Between October, 2000, and May, 2001, the author visited Igloolik twice, spending a total of six months in the community, during which hunters were accompanied on several hunting and fishing trips. With the invaluable help of knowledgeable local hunters and other sources (see below), 400 local place names were plotted on digital maps, and printouts of the maps were carried during trips with the hunters. Experienced hunters were especially pleased to see their place names on maps, and younger hunters were eager to have paper versions to use in their trips as navigational aids. Maps are being increasingly used in Igloolik. Although knowledgeable elders usually travel without maps, they have become essential navigational aids to people who hunt part-time and to those who spent a good part of their formative years in formal schooling. The official topographic maps of the region, however, contain only a few Inuktitut place names and it became clear that a toponymic work leading to the immediate production of maps was highly appreciated. The importance place names within indigenous cultures and their knowledge systems has been widely recognized, as the undertaking of several toponymy projects across North America show. In this paper the methodology used to collect and plot place names and trails is described, and a brief analysis of the relationship between place names and trails and information about the features of traditional trails in Igloolik is provided.

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[5] A version of this paper has been accepted for publication by the journal *Arctic*

Attempts to plot Inuit knowledge and use of the land on conventional paper maps face several challenges, one of the most important being the difficulty of mapping an approach to the landscape that remains and evolves mainly as oral knowledge. Another problem is the seasonally changing nature of the land, which requires a flexible sense of space. Trails on the sea-ice, for example, change as the seasons progress, and there are place names associated with temporary (if recurrent) features, such as ice formations and polynyas.

A common problem for communities attempting to map place names and land use is the complexity of Geographic Information Systems (GIS). They demand a higher degree of technical expertise than is usually available in small, geographically remote communities. Furthermore, GIS software frequently demands relatively expensive equipment, and the time-consuming processing of the data (linked to the need for external consultation) can be frustrating. An excellent overview of the problems frequently faced when mapping indigenous knowledge has been recently published by Tobias (2001). He particularly stresses the conflicts between local knowledge and the need to represent it on maps, and states that "a large number of communities now possess GIS hardware and software but not the capacity to operate it well."

The following sections describe a methodology that can help communities to collect geographic information. The data can be easily converted for further GIS analysis and representation. Working with John MacDonald, director of the Igloolik Research Centre, a simple, cost-effective way of plotting place names as well as recording trails was developed. This included the use of a Global Positioning System (GPS) receiver and companion software, *Fugawi*, which simplified the transition and display of spatial information on to topographic maps, and the creation of geo-referenced databases. *Fugawi* is user-friendly mapping software, designed to make full use of GPS, allowing data transfer between the receiver and the computer. It also creates digital maps, and permits some basic manipulation of the geographic data. One of the most interesting features of this software is its capacity to convert waypoints and tracks into text files, making possible the creation of geo-referenced databases.

A note on the sources and the maps:

The interviews cited in this work (including the ones derived from the author's study) are part of the Igloolik Oral History Project, and will be cited using the name of the interviewee, the year of the interview, and an interview number prefixed by the letters "IE." The Igloolik Oral History Project is a collaborative, on-going project run by the Inullariit Society of Igloolik and the Igloolik Research Centre.

To help the reader locate the maps, Figure 1 is a guide to the location of each individual map mentioned in this essay. Due to the density of place names and the difficulty of putting them on the map without overlapping, some of the names have been omitted from the maps for clarity.

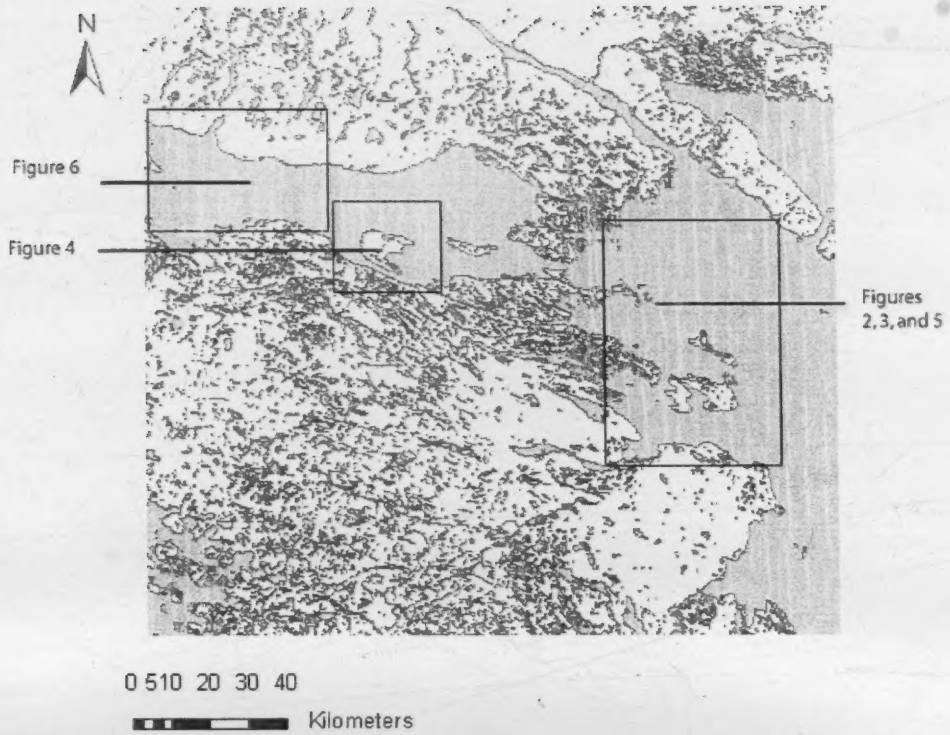

Figure 2-1: Location of maps referred to in this paper

Background

The Inuit hunters of Igloolik have an intimate knowledge of the territory that surrounds them. Moving safely through this region requires the knowledge and experience of generations of travelers. The boundaries of the community are not defined by the boundaries of the town. Instead, the sense of belonging is gained through the shared knowledge of the territory that is constantly traveled.

The familiar territory is full of meaningful sights, stories, marks, events, and place names. Knowledgeable people remember even tiny landmarks along trails or hunting grounds.

They remember ice formations, and they know how to read the snow, the winds, the currents, and the stars (MacDonald, 1998). The territory is populated by hundreds of trails and names that belong to the memory of the people. Dramatic changes (in Igloolik since the late 1950s), including the creation of the town of Igloolik, schools, and new transportation and navigation technologies, threaten to weaken some of this oral knowledge. Until recently, government topographic maps largely ignored Inuit place names. Even in recent editions, most Inuit place names are missing, and trails are entirely absent.

There have been several studies that record Inuit place names. Beatrice Collignon, for instance, mapped 1006 place names in the communities of Holman and Coppermine, and in Bathurst Bay (Collignon 1996). Another excellent example of toponymic work is the "Gazetteer of Inuit place names in Nunavik" (Müller-Wille 1987), undertaken with the cooperation of the Inuit elders of Nunavik and the Avataq Cultural Institute. Place names, in fact, have been of broad interest to anthropologists since Boas (1888). In Igloolik, the accounts of the first European explorers to visit the region (Lyon 1824, Parry 1824), as well as the work of Mathiassen (1928) and Rasmussen (1929), contain several references to Inuit place names.

In Igloolik, a toponomy project in the mid-1980s collected about 350 place names, their coordinates, the features to which they refer, and a short explanation of their meanings (1993). This excellent work was compiled principally by Emile Imaruittuq and André Uttak, and was part of the Government of the Northwest Territories' Geographic Names Program. At the time of my research, however, no maps containing the results of that project were readily available or known to the community. When the maps produced from the present study were shown to the Inullariit Society of Igloolik in May 2001, the elders stressed that it was the first time they had seen their place names, both in roman and syllabic orthographies, so extensively used on topographic maps.

The 350 place names collected in the mid-80s constituted the original source of a database built by me in Igloolik. About 30 names were added upon suggestion of hunters

who looked at the maps I produced and pointed out missing names. With their assistance, some of the coordinates contained in the original database were also corrected. Finally, during the course of hunting and fishing trips, named features were pointed out and waypoints were created with a GPS unit. About 20 place names were added to the database through this method.

A total of 400 place names were plotted on nine 1:250000 and one 1:50000 topographic maps. The resulting maps can be displayed and printed in any number of ways. For instance, in a presentation to the community, computer projections of the maps allowed zooming to provide detailed maps of specific places, a display of digital photographs and information about those places. Hunters wanted maps to use when traveling. These were printed using a conventional color printer and then laminated for durability. With the support of the Igloolik Research Centre the names were transcribed into the syllabic orthography and a parallel database with the syllabic version of the names was created.

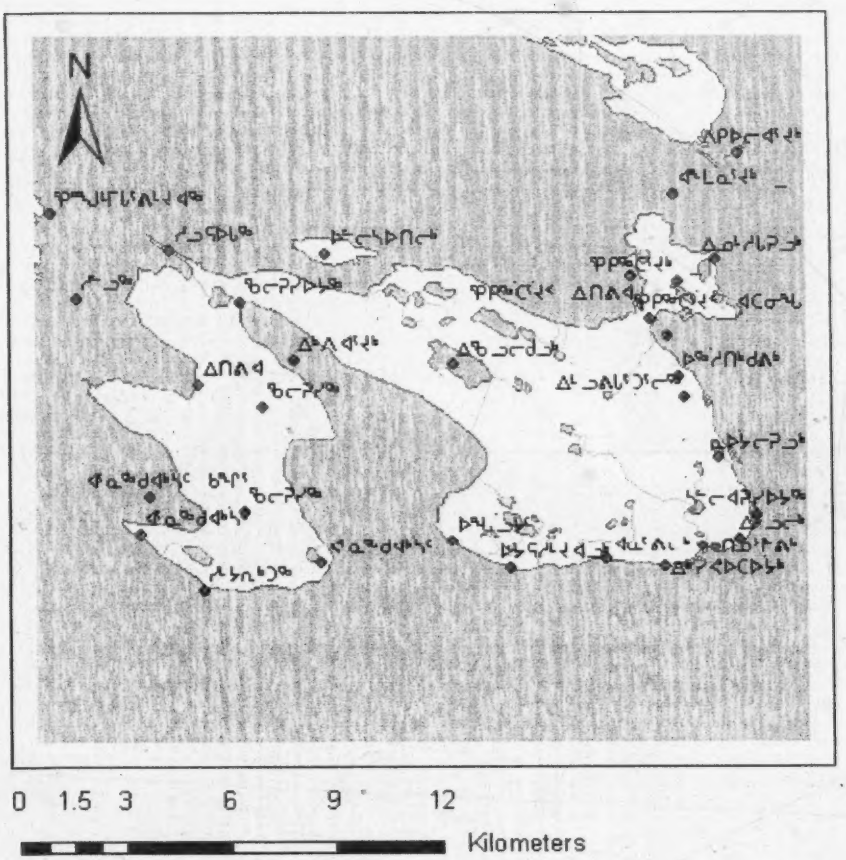

Figure 2-2: Igloolik island with place names in syllabic orthography.

This paper is not intended to provide a detailed analysis of the place names database. It suffices to say that the names refer to a variety of different features, including lakes, rivers, creeks, coastal features, hills, islands, camps, inuksuks (*inuksugait* in Igloolik), rocks, recurrent ice formations and polynyas (polynyas are of utmost importance for Inuit hunters because they constitute a reliable source of marine mammals in winter).

Trails

Along with the place names, 37 trails were recorded during 2000-2001. Of these, five were drawn by two hunters on the computer. Six were drawn on paper maps by two hunters and then digitized. Twenty-four trails were recorded by a GPS unit I carried while accompanying an experienced hunter on his fishing and hunting trips. Finally, two were reconstructed using geographic clues provided by two interviews in the Igloolik Oral History Project database.

Trail	Variations
Igloolik-Saglarjuk	3
Saglarjuk-Majuqtulik	4
Igloolik-Naluqqajarviup Tasia	2
Igloolik-Kinguraq	2
Igloolik- Kangirsukutaap Qinngua	3
Kinguraq-Tasiujaq	1
Igloolik-Hall Beach	2
Igloolik-Alarnaarjjuk	2
Trails within the island of Igloolik	4
Igloolik to the floe-edge	1
Fishing trails around Naluqqajarviup Tasia	5
Caribou hunts	4
Polar bear hunt	3
Seal hunt through breathing holes	1
TOTAL	**37**

Table 2-1: Igloolik trails

The right column on Table 1 indicates the number of alternate routes for trails departing and arriving at the same locations. Of the 37 trails, 23 correspond to traditional, well traveled routes, while the trail from Igloolik to the floe-edge varies slightly from year to year. The rest of the trails were associated with caribou and polar bear hunting, as well as with fishing and sealing locations.

Fugawi proved to be easy and intuitive for drawing trails. Of the two hunters who drew the trails using this software, one was in his late forties and had basic computer skills; the other, in his mid-fifties had never used a computer. Both felt comfortable with the use of the mapping software.

Twenty-four of the trails, totaling about 2000 km of tracked courses, were recorded with a GPS unit on snowmobile trips. *Garmin GPS III plus* was chosen mainly because of its map display capabilities, which allow the user to see fairly detailed topographic maps, as well as one's current location and tracks (very useful features when discussing the characteristics of the recorded trails with hunters during the trips). Due to extreme cold temperatures and high winds, and considering that the GPS needed to be *on* during the trips, I placed the unit underneath my clothing to keep the batteries warm, with the external antenna attached outside the clothing to ensure clean reception during the trip. Satellite reception was tested several times. The unit almost always showed 3-D navigation, an indication of excellent satellite signal reception. The tracking option of the GPS was set to record a track-point every 30 seconds, reproducing in fine detail the location of trails.

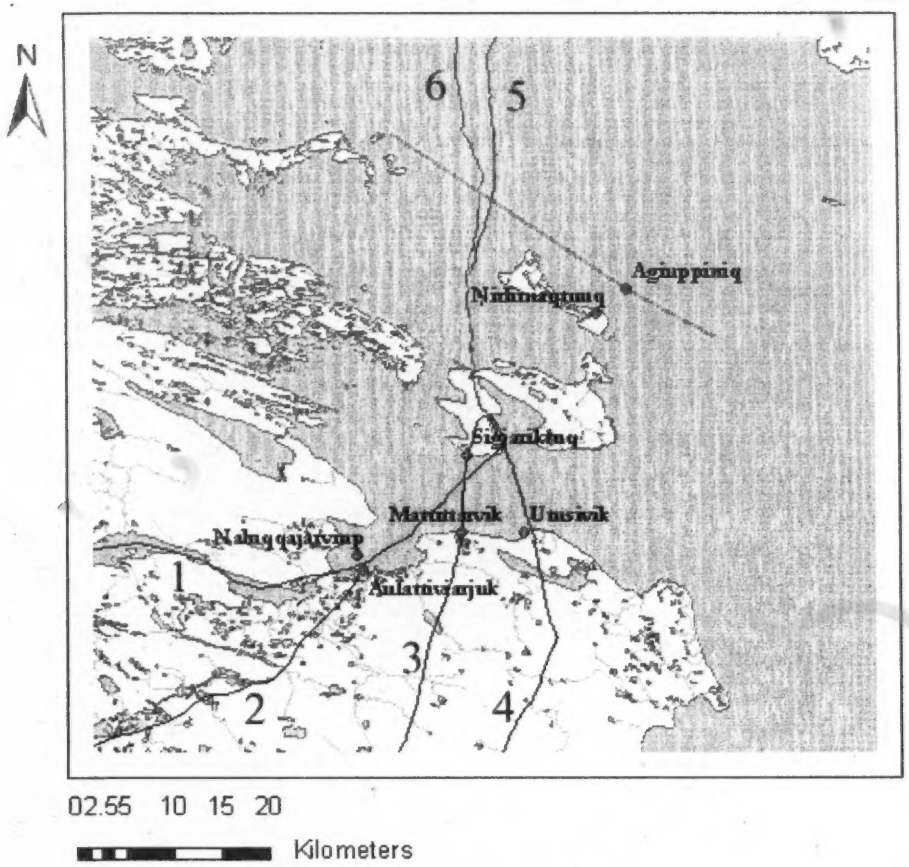

Figure 2-3: Map of Igloolik island with several trails. Most place names have been omitted for clarity.

The trails in Figure 2-3 are followed every year by Igloolik hunters, but they only become visible after dog sleds or snowmobiles have made the first tracks on the snow. About 30 hunters, consulted through formal interviews or informal conversations, agreed that the land portions of the trails are stable throughout time (also see MacDonald (1998:188). Most of the trails to favorite hunting grounds or connecting to other communities have been used for generations, are maintained through the memory of the people and are transmitted orally or while traveling. Louis Alianakuluk, a hunter in his mid-60s, assures that:

> Land routes are really old, especially through isthmuses. All of these are the trails ever since they used to travel by dog team. People before us would have known all of these land routes. The people before us who traveled only by dog team were really good at what they did, and knew that land. (2001)

All the land trails plotted onto maps during the course of this study share a common feature: they tend to avoid rocky grounds and abrupt changes in altitude, and they favor frozen lakes and rivers, valleys and coastal lines. This often results in trails characterized by meanders instead of straight courses. Lakes and riverbanks often provide smooth travel conditions (see trails 1, 2, 3 and 4 in Figure 2-3). Hills are generally used as reference points to set or keep bearings when traveling on flat areas.

Some ice formations, namely ice leads and ice ridges, are recurrent from year to year in the same locations (Aporta 2002). These icemarks are so predictable that many are named. Some of them become important features in defining trails. *Agiuppiniq*, an ice ridge whose name implies "building up from above," is one of the most important visual features of the area, despite the fact that it disappears as the ice melts. *Agiuppiniq*, drawn by Louis Alianakuluk as a line and registered with a GPS as a waypoint (see Figure 2-3), can be spotted from far away, constituting a more visible feature in the winter than the entire and extremely flat island of *Nirlirnaqtuuq* (Neerlonakto Island). This icemark establishes a turning point on routes between Igloolik and the eastern coast of Baffin Island (see Trails 5 and 6).

Trails 3 and 4 illustrate another pattern frequently seen on ice trails. On the smooth ice between Igloolik island and the mainland, it is apparent that the two trails are not set haphazardly. On the contrary, they aim at visible, named landmarks on both coasts. Although they may vary slightly from year to year due to changing ice conditions, they remain fairly fixed in terms of their general location and, especially, the spots where they reach the land. The crossing of the inlet is, roughly, eight kilometers in length, and, in good weather, an experienced traveler can distinguish numerous landmarks from the opposite shore.

Trails and place names

Plotting the place names and trails on maps revealed the presence of numerous place names along trails.

Figure 2-4, for instance shows how several GPS-recorded trails going to or coming from the island of *Saglarjuk* (Amherst Island) merge at one particular spot on the coast of Melville Peninsula. This place, a small hill, is named *Qakkiaq*, which, fittingly, means "landing place."

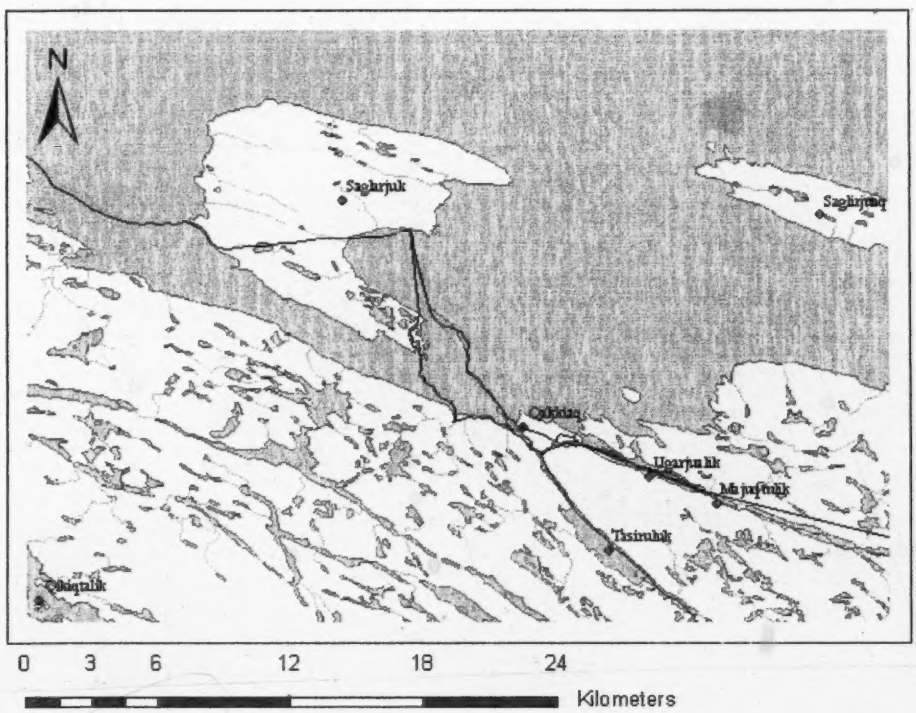

Figure 2-4: Ice trails merging into Qakkiaq.

Some of the trails themselves have names, which correspond to a significant place name along the trail. For instance, in Figure 2-3, the route to *Alarnaarjjuk* (trail 1) in Melville Peninsula is known as *Alarnaarjuliariaq*, but a variation of this route that goes through *Inuksugalik* is known as the *Inuksugalik* route (trail 2). *Inuksugalik* is the name given to an inuksuk along the trail. Both *Alarnaarjjuk* and *Inuksugalik* are located to the left (west) of the portion of the map shown in Figure 2-3.

Igloolik travelers use place names in the narratives of their trips. Interviews suggest that these narratives usually unfold in strict chronological order: from the beginning to the end. Theo Ikummaq, for instance, pointed out that he spent two evenings on the local radio describing a 1987 trip from Igloolik to Greenland.

> Actually we had a radio show, a local radio, where we spent a couple of evenings, just talking about the trip. One of the elders doing the interview about the trip. And we didn't cover bits of pieces of the trip. We covered from day one, and we progressed. The way he asked the questions didn't allow us to jump from here to there. It made us talk from the day we left, the first few days, the next few days, and so on and so forth, to the point that half of the trip was covered one evening and the next half another evening. Again, it was a learning experience for the people who were listening. They would know what to expect if they were going to take some of that route (2000).

Place names are not only used to describe trips but also in other narratives. Most of the legends and life stories contained in the hundreds of interviews of the Igloolik Oral History Project can only be fully appreciated when accompanied by an understanding of the numerous spatial references mostly in the form of place names. One of the most significant stories in Igloolik is the legend of *Uinigumasuittuq* (the woman who married a dog). The main events take place at *Qikiqtaarjuk* ('small island'), a peninsula forming the NE tip of Igloolik Island (see Figure 2-5), (Paniaq 1990). In the story of Atanarjuat as told by Michel Kopaq (1987), there is direct or indirect reference to eight place names: *Iglulik*, *Iksivautaujaq*, *Naggutialuk*, *Pingiqqalik*, *Qikirtaarjuk*, *Siuraq*, *Tasiujaq*, and *Uglikuluk*. Atanarjuat escapes from his brother's murderers running from *Qikirtaarjuk*

over the sea-ice to *Siuraq* (Tern Island). On the way, he jumps across an ice lead locally known as *Naggutialuk*.

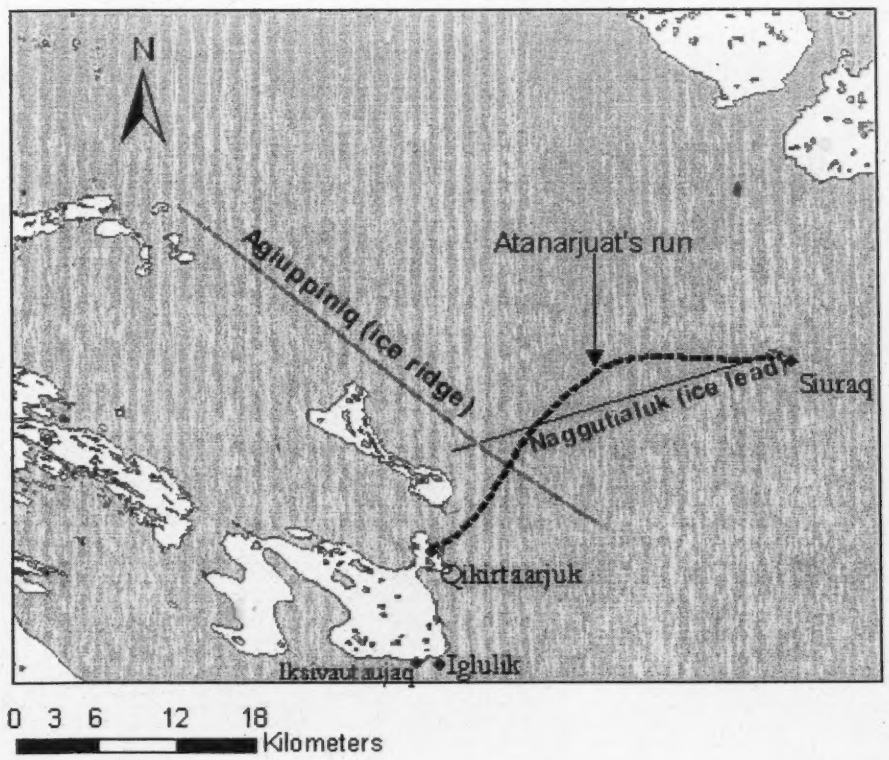

Figure 2-5: Some of the place names mentioned in the story of Atanarjuat. Ice leads and ridges were drawn by Louis Alianakuluk. Atanarjuat's run was reconstructed after Kopak (1987)

Both the role of place names in narratives and the relationship between place names and trails suggest that an Inuk traveler does not move through homogeneous, featureless space (as the Arctic environment is often pictured by outsiders) but through a homeland defined by the presence of hundreds of names, trails, personal and social memories, and

stories transmitted from generation to generation.

Ice trails

Trails on the sea ice are not as stable as trails on the land. They vary with the seasons. The town of Igloolik is located on a small island where no game is found within its borders, so the hunters of Igloolik must, all year round, cross bodies of sea water which separate them from the caribou hunting and fishing lakes and rivers on Baffin Island and Melville Peninsula. A combination of patience, knowledge, and good judgment is necessary to attempt early crossings of the frozen sea during the fall. The location of these ice trails vary according to the patterns of the freeze until they reach a stable course that will be used until the thaw. Figure 2-6 shows the sequence of trails to the hunting ground of *Majuqtulik* from Melville Peninsula, across *Ikiq*, as the ice thickens.

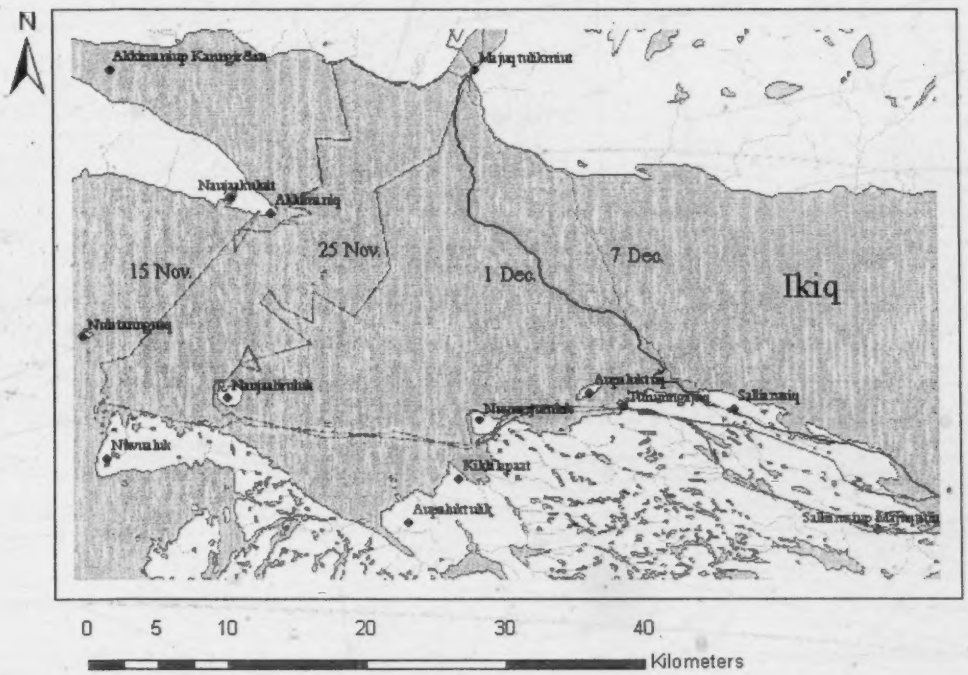

Figure 2-6: Four ice trails crossing the Fury and Hecla Strait.

From left to right, on figure 2-6, the first trail illustrates the first crossing of the year (15 November, 2000) and was drawn by George Qulaut; the second shows Qulaut's return trail. The next two trails (recorded with the GPS) reproduce trips led by Maurice Arnatsiaq to Majuqtulik on December 1 and back on December 7. The location of the trails is related to the pattern of the freeze up (from west to east, on that section of the strait). The first two trails required long detours, while the last, the most efficient, became the permanent trail until break-up.

The advantages of this method

Beyond the recording of place names and trails, the methods used in this project are important in their own right. The ease and speed with which place names and trails were mapped and corrected, and the ability of people with little previous experience to undertake this work successfully, demonstrate the viability of this methodology for community-based toponymy projects. Such projects will help demonstrate the extent to which many aboriginal communities have and still use their lands, are now making to regain control over their territory.

Projects such us the *Nunavut Atlas* (Riewe 1992) and the *Inuit Land Use and Occupancy Project* (Freeman 1976), as well as toponymy projects such as the *Gazetteer of Inuit Place Names in Nunavik* (Müller-Wille 1987), have successfully helped in gaining understanding and acceptance of the Inuit way of using and referring to the territory.

The mapping software used in this research (*Fugawi*) is intuitive and inexpensive, and it does not require expertise in Geographic Information System (GIS) programs. *Fugawi*'s greatest strength as software may also be its greatest weakness: although it is simple to use, and produces maps that display reasonably accurate spatial plots, it is not a full-fledged geographic information system. Furthermore, place names can only be recorded as points because the software does not allow working with polygons. Much depends, of course, on what one wants. In the case of this project, the greater complication and expense of developing a spatially-precise geographic information system was not

warranted. Importantly, the approach presented here requires little outside expertise.

One of the most important features of Fugawi is that the geographic data plotted on maps can be exported into text files. Those, in turn, can be easily converted into *shape* files for use with GIS programs such as *ArcView* and *ArcInfo*. A program similar to *Fugawi* is *OziExplorer*, which allows even easier communication with GIS software, permitting the user to save waypoints and tracks directly as shape files. With both *Fugawi* and *OziExplorer*, place names can be collected locally and maps quickly produced for community use. At the same time, databases containing geo-referenced information can be easily created. Further GIS analysis and manipulation may be required at later stages, but communities can have a tangible, visually attractive product immediately available. The methods used in this project were flexible enough to allow mapping of changing features, overlaying of place names and trails, creation of a place names database, and production of maps for local use.

This software has other potentials, including the design of interactive material for educational use in schools. During this particular study in Igloolik, a survey of placenames on the island of Igloolik and surrounding territory recorded the location of 55 place names using a GPS receiver. Digital pictures were attached to the names, and, in the near future, comments by a knowledgeable elder will be converted into digital audio files and linked to the names on the maps.

Finally, and since each place name is technically a waypoint, the coordinates of the names can easily be uploaded to a GPS unit, and used for navigation. The database is presently available to those who want to use it at the Igloolik Research Centre.

Conclusion

The mapping of place names, trails, and other relevant geographic information does not need to be an expensive, painstaking process. With the use of mapping programs and GPS receivers, mapping has become accessible (and affordable) for aboriginal

communities involved in toponymy and land use and occupancy projects.

This new technology is flexible enough to permit mapping of seasonal features, such as icemarks and trails. More importantly, the data collected through this method is geo-referenced, easily storable in a database, and, eventually, accessible through GIS software.

This project suggests that inexpensive and straightforward computer-based mapping methods can provide an appropriate and accessible way for communities to undertake toponymy projects and to inaugurate, if necessary, more extensive mapping projects.

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Chapter 3:

Life on the Ice: Understanding the Codes of a Changing Environment[6]

"This is true and that is the nature of the moving ice."

—Aipilik Inuksuk, Igloolik, 1988

On 27 March 2001, Maurice Arnatsiaq and I were conducting a place-names survey of the island of Igloolik and surrounding area. It was noon and having completed the survey of the eastern coast, Maurice guided me onto the sea ice towards Nirlirnaqtuuq, a relatively large island (about 12 kilometres long) a few kilometres north of Igloolik. The island is known as "Neerlonakto" on topographic maps[7]. *Nirlirnaqtuuq*, with low topographic features, was barely visible from the distance, forming almost a whole with the sea ice. After taking the island's geographic coordinates, I asked Maurice about a landmark that we could clearly see standing towards the north. It looked like a long, flat hill or a ridge, but I could not see any signs of land on my topographic map, according to which the closest coastline on that direction was 35 kilometres away, on the other side of *Ikiq* (Fury and Hecla Strait). My companion invited me to board my snowmobile and drive to that place. We drove only four kilometres before arriving at the feature which, to my surprise, was entirely made of ice. What I had taken for a landmark was, in fact, an icemark. The ice ridge, which was about three metres high and several kilometres long, even had a name: *Agiuppiniq*.

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[6] A version of this chapter has been published. Aporta 2002, Polar Record 38 (207): 341-354.

[7] It is noted that, in this article, Inuktitut place names are used whenever possible (appearing in italics). Iglulik is used when referring to the traditional hunting camp, southeast of the island, while "Igloolik" will be used when talking about the island as a whole, or the town of Igloolik. For practical reasons, place names such as "Baffin Island" and "Melville Peninsula" are also used.

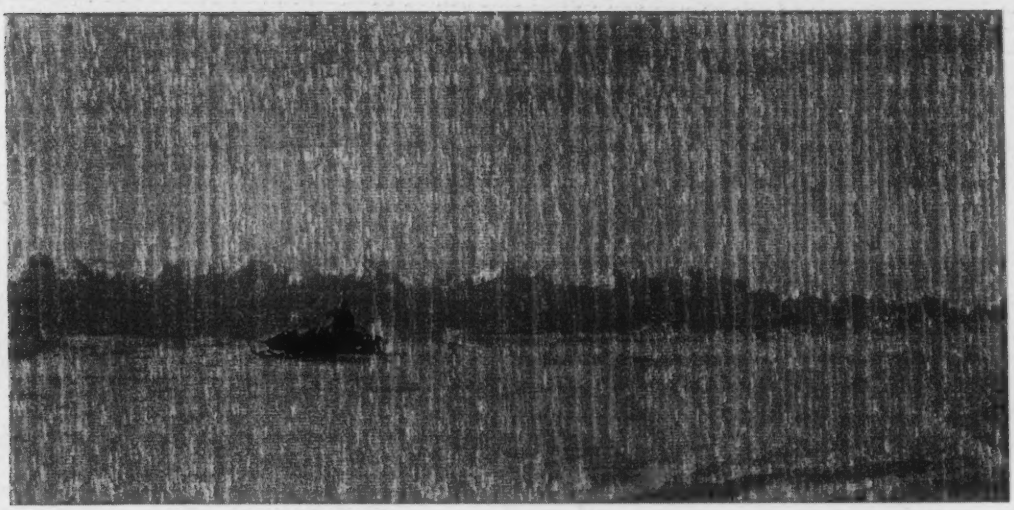

Figure 3-1: Agiuppiniq

This name was not on the topographic maps that I carried, neither had it been recorded during a place-names program conducted in Igloolik in the mid-1980s. Yet *Agiuppiniq* was distinctively recognised in the community as a place name, since several people whom I consulted could readily point to it on the map. I later realised that for some elders it was a very significant place, and that the name *Agiuppiniq* was frequently mentioned in the database of the Igloolik Oral History Project[8].

Agiuppiniq is one among hundreds of marks that constitute the topography of the sea ice around Igloolik. Not all of them are alike. Some of them refer to the stable land-fast ice while others to the ever-changing moving ice. Some recur in the same locations every year while others vary in their position from year to year. Only a few of these sea-ice features can be identified as place names in a way that is comparable to the naming of geographical features on land. All of them help the Inuit of Igloolik to remember, live on, travel through and talk about the familiar topography of the sea ice.

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[8] The project is a collaborative, on-going effort run by the Inullariit Elders Society of Igloolik and the Igloolik Research Centre. Begun in 1986, the Igloolik Oral History Project seeks to document the traditional knowledge and oral history of the Amitturmiut—the Inuit of the Northern Foxe Basin area of Nunavut. Most of the interviews cited in this work (including the ones I conducted) are part of the oral history project, and are cited using the name of the interviewee, the year of the interview and an interview number prefixed by the letters "IE" (Inullariit Elders).

This article is concerned with the knowledge of the sea ice as developed and transmitted by the Inuit of Igloolik. This information was obtained from travelling, observation and interviewing that I conducted from October 2000 to May 2001 in Igloolik, as well as on several existing interviews from the Oral History Project database. Inuit knowledge of the sea ice reveals a deep understanding of the complex relationships among ice, currents, the moon and the winds, as well as a holistic approach to knowledge where classification based on a western scientific approach becomes difficult if not counter-productive.

Through detailed knowledge of the ice topography, the sea ice becomes a familiar territory for the Inuit of Igloolik and, through the understanding of the "codes" of the moving ice, its changing nature becomes predictable. This article does not pretend to give a full account of a system of knowledge the understanding and practice of which requires a lifetime of apprenticeship. It will only describe some of its elements and offer some insights regarding this complex aspect of *Inuit Qaujimajatuqangit* (Inuit knowledge, also known as IQ).

The geographic situation of Igloolik

The community of Igloolik is situated on the island of the same name located in northern Foxe Basin, between the northern Melville Peninsula and Baffin Island, in Nunavut, the new territory established in 1999 in the eastern Canadian Arctic. Both archaeological evidence and ethnographic accounts indicate that Igloolik has been a centre of human habitation for thousands of years.

Dealing with the marine environment is an everyday activity throughout the year in Igloolik. Since little hunting and fishing is carried out within the boundaries of the island or from its shores, most activities require sea travel. The travelling takes place mostly over ice, except for the short periods of open water, from July to October. Generally speaking, ice travelling is performed during nine months of the year. Lake fishing and

caribou hunting on Melville Peninsula and Baffin Island require the crossing of frozen straits and, therefore, a continuous assessment of ice conditions and an understanding of ice behaviour and its interaction with the winds and the tides. Intensive seal and walrus hunting is also practised from the ice, either at the floe-edge of the neighbouring polynyas (sea that remains open throughout the year) or through breathing holes. Not long ago, the ice was also a place to live, where ice camps were established throughout a good part of the spring.

The ice as home: A place to live

Although the material aspects of ice camps cannot be verified through archaeological remains, both the memory of contemporary elders and the notes of early explorers give account of the yearly events related to life on the ice[9]. The first Europeans to visit Igloolik, the British explorers Parry and Lyon, remarked in April 1823 how most people had left the large winter settlement of *Iglulik* to live in smaller camps closer to more-favoured hunting areas. Of the three camps mentioned by the explorers—*Agiuppiniq*, *Pingiqqalik* and *Uglit*—the first one was located on the sea ice. (The explorers did not use the name *Agiuppiniq*, referring to it only as "the ice-camp.")

Captain Lyon, in his journal entry of March 22, 1823, mentions having heard of "the prosperity of the people on the ice" (1824: 250) at about 20 miles (32 kilometres) north of the snow houses of *Iglulik* (ibid.) and eight miles to the west of Tern Island (Parry, 1824: 423). Lyon himself visited the ice village, where he found 28 people living in five snow houses (Parry, ibid.: 423). The geographic clues about the position of this camp provided by both explorers give clear indication that the camp was located somewhere between *Agiuppiniq* and an ice lead known in Igloolik as *Naggutialuk* (Figure 3-2).

One hundred years later, Mathiassen, a member of the Fifth Thule Expedition, records in

[9] Saveller, however, identified material aspects of snow dwelling sites through the study of disturbed gravel surfaces on neighboring beaches (1884). Gravel was utilized for bed platforms, as described in page 40.

April 1923 the existence of a "snow-house village" on the ice north of Qikiqtarjuq (1928: 30), at the same general location as the ice village described by Lyon. Mathiassen does not provide a description of the village, but notes that the inhabitants hunted "*utoq* seal" (seals that are basking in the sun).

The ice camp at *Agiuppiniq* is remembered by contemporary Inuit elders. Louis Alianakuluk, a hunter in his mid-sixties, remembers his life at the ice camp:

> In my childhood [late 1930s], we used to go to that place, that is *Agiuppiniit*[10]. From *Avvajja* we would go to *Agiuppiniit* to get closer to the floe-edge, the entire family would move to that area ... that would become our home for a while. This happened as the sun was getting higher. The main reason was so that we would get to eat different diet than the *igunaq* [fermented walrus meat]. There would be marine animals such as seals and walruses, which were mainly the animals that were hunted during that time. So we used to get closer to the floe-edge by establishing ourselves at *Agiuppiniit* ... at first there would be only a few but the numbers would grow as families moved in, so that would make the place with quite a few people (2001).

The late Aipilik Inuksuk pointed out that in the spring, people residing at *Avvajja* (a former settlement located 20 kilometres southwest of *Agiuppiniq* and about eight kilometres northwest of the present settlement of Igloolik—see Figure 3-2) would move to the land-fast ice at *Agiuppiniq*:

> This location was suitable to the hunters that would hunt on the ice through seal breathing holes at *Ikiq* (Fury and Hecla Strait). The place that I refer to as *Agiuppiniq* is located in this area ... we used to make our home just past that where there is no danger of

[10] *Agiuppiniit* is the plural form of *Agiuppiniq*. This ice ridge, however, is generally known as *Agiuppiniq*.

ice cracking and [of being] carried out to sea (1986).

Michel Kupaaq also remembers that in early spring they would go "to the ice camp at *Agiuppiniq* where there were numerous people already living there, as we arrived we started to make camp with the building of an igloo (1987). George Kappianaq (1991a-b), and Noah Piugattuk (1991) also refer to the spring camp at *Agiuppiniq* where the men would hunt seals at the breathing holes (*agluit*) situated on the cracks of the land-fast ice.

All the references cited indicate that the place where the ice camps were established was effectively known as *Agiuppiniq*. The reasons for choosing that place were related to the safety of the ice, which remains stable throughout the spring, and the abundance of wildlife, especially seals, which were hunted mainly through *mauliq* (hunting seals through snow-covered breathing holes). Referring to the lead known as *naggutialuk* (great or large lead) in the proximity of *Agiuppiniq*, Louis Alianakuluk points out that "from the time of my childhood, I have known it to be hunted" (2001). A great deal of *mauliq* still takes place today at the same lead, especially when the tidal strength of the full and the new moons widens the crack (Ikummaq, 2000a). Another good reason for settling down in *Agiuppiniq* could have been the large size of the snowdrifts in the area, providing good material for igloo building (John MacDonald, personal communication).

The evidence shows that the ice camp has been in the same general location since at least the first written record (1823), which indicates that some features of the sea-ice topography have not changed for at least 200 years. Both *Agiuppiniq* and *Naggutialuk* seem to have recurred in the same general area year after year throughout this time. Figure 3-2 shows the location of the ice camp as described by Lyon, Parry, Mathiassen and Louis Alianakuluk. The location of the ice ridge *Agiuppiniq* is also shown as measured by a global positioning system unit in March 2001. Both lines representing the ice ridge and the ice lead *Naggutialuk* were drawn by Louis Alianakuluk.

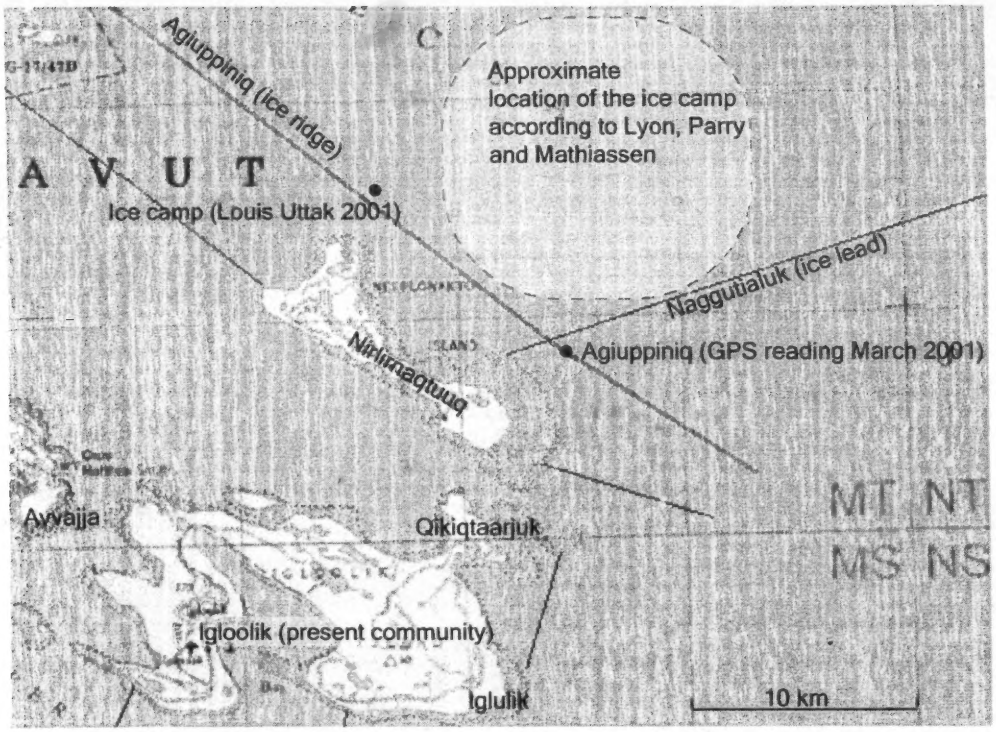

Figure 3-2: Ice camp at Agiuppiniq

What at first might be regarded as an ever-changing, unpredictable environment, appears to be, in fact, fairly stable. The structure of the ice topography is constituted by seasonal icemarks, but many of them are also stable and recurrent. In the memoryscape of the Inuit of Igloolik, the topography of the land-fast ice may compare with the topography of the land. In fact, the land environment in the region of Igloolik is also constituted by seasonal landmarks that *disappear* under a thick layer of snow through most of the year. The concept of memoryscape has been defined by Mark Nuttall (1992) not as mere physical territory remembered by a particular individual, but the result of a community's interaction with a place through time.

The ice camp at *Agiuppiniq* has not been included as an Inuit settlement site in many important anthropological studies (see, for example, Crowe 1969, Rasing 1994) even though *Agiuppiniq* has been a recurrent spring settlement for at least 200 years of written

history. One of the reasons for this absence might be that ice camps leave no archaeological remains. The difficulty in determining Inuit prehistoric use of the sea ice has been discussed by Wenzel (1982). He points out that there are three sources of archaeological data for determining patterns of sea-ice use: house sites, faunal remains and artefacts. The most relevant (as archaeological evidence) of the three, the house structure, "is as transitory as the sea-ice environment" (1982: 45).

Furthermore, topographic maps do not illustrate the features of the sea ice and elders have difficulty pointing out such features when commenting on regular topographic maps. However, *Agiuppiniq* was considered to be not only a good place for hunting but also a pleasant place to live: a place people could call *home*. Remembering the night he spent at *Agiuppiniq*, Captain Lyon remarks that "I never slept so warmly" (1824: 251). Asked to compare dwelling on the sea ice with dwelling on the land, Louis Alianakuluk also says:

> The only thing is that material for bed platform that would cover the bed platform is not available on the sea ice. So they used to go and get gravel for this purpose from *Nirlirnaqtuuq*. That was the only difference, that is not having any materials that would keep your bedding from the snow bed platform. I believe that was the only thing. It is much warmer than the land when you make your igloos on the ice. This is in the winter. This is something that I have heard and I know that it keeps the igloo much warmer than the land (2001).

Igloolik hunters still keep their dog teams on the sea ice, not only because it is close to the community, but also because they think the sea ice is warmer than the land (John MacDonald, personal communication). Louis Alianakuluk has fond memories of his childhood at the ice camp, where they would play such games as "*amaruujaq*, *aammakasauti* (tag), *uqsuutaaq* and other games like *taqqiujaq*" (2001). Life at the ice camp, therefore, was not entirely occupied by hunting. The place offered the conditions

for warm shelter and people found the time to entertain themselves. They were at home on the ice.

A recurrent topography

There have been several studies giving full or partial attention to Inuit knowledge and use of the ice. Nelson (1968) gives perhaps the most detailed explanation of ice environments yet written, providing an extensive lexicon of sea-ice terms. Nelson also points out that the Eskimos of Wainwright, Alaska, divide the environment into two separate entities: land and sea. In turn, they divide the sea ice into two different conditions: stable and moving (9). In similar fashion, Collignon, focusing her studies on the Inuinnait of the Victoria Island region, has described the perception of three types of surfaces which are "clearly opposed to each other" (1996: 100). These are *nuna* (the land), *hiku* (the ice cover) and *tariuq* (the sea). Freeman (1987) writes extensively about contemporary use of the sea ice and stresses that both the ice surface topography and ice movement are of "major concern for travelers" (*ibid.*, 74). He also illustrated some recurrent ice cracks in the Resolute Bay region (*ibid.*, 82).

MacDonald compiled a list of 117 terms related to snow and ice (1989) from three different sources: Schneider's *Ulirnaisigutiit: An Inuktitut-English Dictionary* (1985), a manuscript prepared by Spalding (1979) and Emile Immaruituq (an elder from Igloolik). Müller-Wille published a list of 31 Inuit words "which are used in geographical names to identify places according to their particular attributes such as snow and ice" (1985, 56). Of this list, however, only 15 terms refer to the sea ice. Brody (1976) wrote about knowledge of the ice in the Igloolik area, and especially about Igloolik hunters' attitudes towards the moving ice (*ibid.*, 164). Riewe (1991) provides convincing data about the extensive use of the sea ice by the Inuit of Nunavut and analyses Inuit sea-ice technology. He considers that "virtually the entire landfast ice region in Nunavut is currently utilized" (*ibid.*, 5). A report on traditional knowledge of Inuit and Cree communities compiled by the Hudson Bay Programme (Arragutainaq, 1995) offers a detailed description of Inuit

knowledge of the sea-ice structure and dynamics in the Hudson Bay region. The report also provides a list of 83 sea-ice terms.

The topography of the ice is created every year when the land-fast ice solidifies. Several features of that topography will recur year after year in the same locations owing to the configuration of the coastline, submarine features and the action of the currents. The Inuit knowledge of this topography is not the result of mere observation and the memorisation of ice features. Instead, it is the consequence of a comprehensive understanding of the behaviour of *Ikiq* (Fury and Hecla Strait) in relation to land formations, winds, currents and tides.

Theo Ikummaq describes different features of *Ikiq* as a recognisable "structure of the ice" (2000a). To show the recurrence and stability of ice features, he tells a story about a trip he undertook in 1987 from Igloolik to Greenland. Before departing from the community of Arctic Bay, on the northern coast of Baffin Island, the travel party sought advice from an elder who had made a similar trip 25 years earlier. Explaining to the travellers what was the best route to cross from Ellesmere Island to the Greenland coast, he was able to give a detailed account of the topography of the ice. Here is part of the description the elder provided, as recalled by Ikummaq:

> [F]rom Makinson Inlet [on the east coast of Ellesmere Island] you are going to hit a pressure ridge, and then there is going to be less snow once you hit that pressure ridge, because, when the snow accumulates over the year, the older the ice the more snow it has. So there was a pressure ridge, he said, "don't stop, don't use the first pressure ridge. Use the third one." So we had to cross over this one, cross over the next one, and cross over the next one until we hit solid snow, where it was smooth sailing. And then, you know, that had been 25 years prior, and then if you look at that you can pretty well determine it doesn't change much over the years (2000a).

The travellers found the strait to be exactly as the old man had told them. Cracks, ridges, snow features were just the same, 25 years later.

Inuit have several terms for ice formations and processes, making a simple classification of this lexicon extremely difficult, since multiple categories occur depending on the approach of the speaker and, in cases where the terms were given in the context of an interview, on the direction suggested by the question. The terms reflect the dynamics of the sea-ice environment, from its formation in late summer/early fall to its break-up in late spring (for a list of terms, refer to Appendix 1).

Pauli Kunnuk (1990), describing the process of freeze-up at a bay in late summer and early spring, uses the terms *illuvalliajuq* (referring to a portion of the sea where a river flows, which usually freezes before the rest of the sea) and *qainguq* (when shorelines start to freeze). The ice condition *qainguq*, however, when carried away by the wind or the high tide, will be called *quvviqua*. In early fall, when the new ice stabilises in the bay, *qainguq* will become *sikuaq* (thin ice formation, the first stage of the freeze-up) and in late fall or early winter, *sikuaq* will finally transform into *tuvaq* (land-fast ice).

The terms can be organised, then, following different classification criteria. For instance, *iilikulaat*, *maniilagalaat*, *maniilait* and *sikutugait* refer to different types of ice ridges. Leads (*naggutiit*) can be classified in terms of their relative position in relation to the floe-edge (*napakkutit*, *naggun*) or in terms of their origin (*atuarutit*). Shore cracks are also named separately (*tilliqpaaq*, *akulliq*, *salliq*) in relation to their relative position to the shore. Finally, the different structures around the floe-edge are also named (see Section 4 on moving ice). Figure 3-3 illustrates some of the features and processes of the sea-ice environment that have been named.

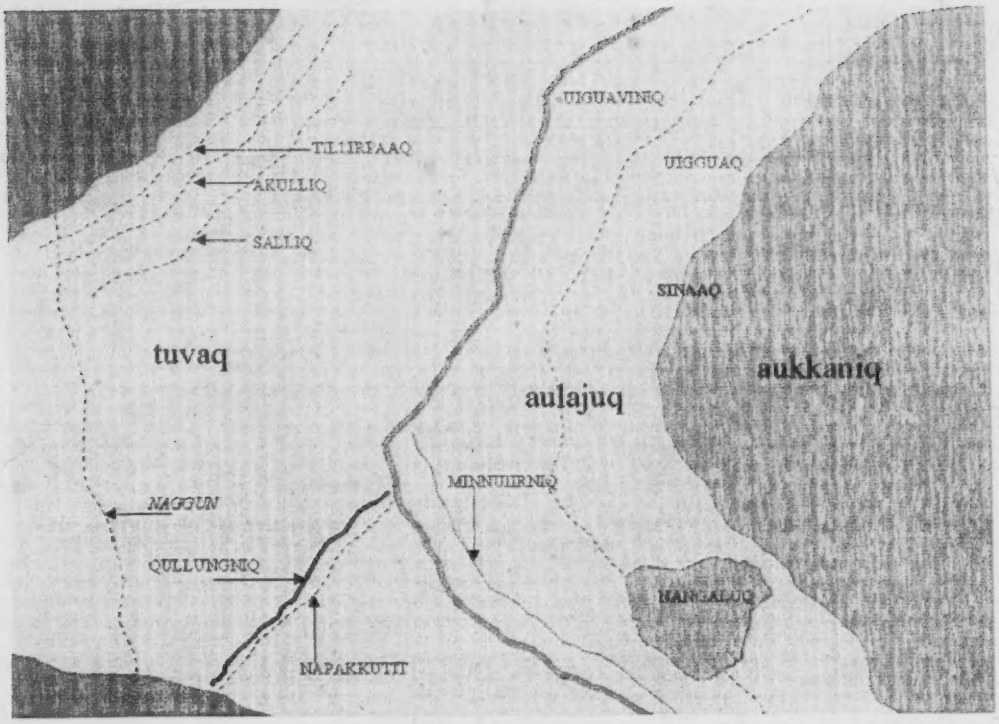

Figure 3-3: Terminology of the ice. Solid lines represent ice ridges and dashed lines ice leads and cracks.

Classification of the terms is difficult mainly because the Inuit approach to the sea ice is experiential rather than theoretical. In order to make full sense, a term must be identified with the speaker, whose speech, in turn, refers to a specific place at a particular time of the year under particular circumstances. For this reason the exact date, location and, in some cases, the time of the day in which some statements were made, were recorded in this study. *Tilliqpaaq* ("the one that is higher than the rest"), for example, refers to the closest shore crack (as viewed from the land), and can only be fully comprehended in the context of a conversation.

Place names on the ice?

Agiuppiniq, as shown above, is widely recognised as a *named* place. In fact, it is evident

that within the community there are several recurrent ice features that are recognised and situated by their names. Theo Ikummaq explained that on 18 December 2000 (the day of the interview) there was a crack that the tidal currents driven by the full moon would have opened. It was an important crack, a good place to hunt seals through breathing holes. "If somebody is to ask 'Where is it?,'" Theo Ikummaq said, "it's at *Agiuppiniq*, and that describes that different structure on the sea ice. Where it had been grounding, and then piling and grounding, to the point where it is now four or five feet high, and it's got a straight edge. That's what they look for. They go there and that's where they find the crack" (2000).

The recurrent, named ice features shown in Figure 3-4 were mostly plotted by Louis Alianakuluk.

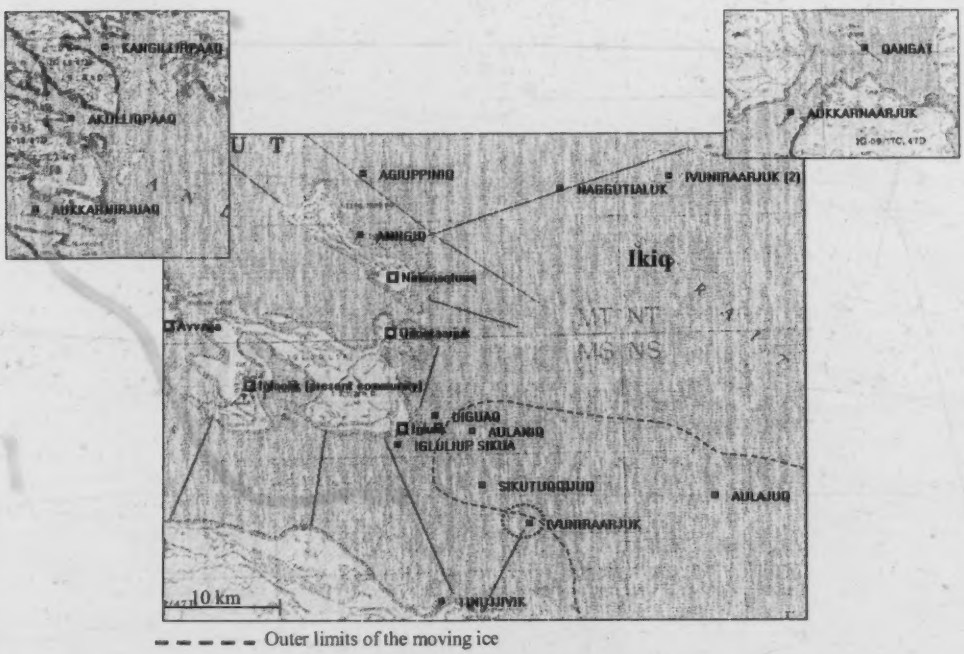

Figure 3-4: Recurrent ice features (source: Louis Alianakuluk)

Some of the names refer to polynyas (*Akulliqpaaq*, *Aukkarnaarjuk*, *Aukkarnirjuaq*, *Kangillirpaaq*), others to leads (*Naggutialuk*), general areas (*Sikutuqqijuq*) and outstanding ice formations, such as ridges or ice buildups (*Agiuppiniq*, *Ivuniraarjuruluk*). Finally, it is common to name portions of land-fast ice in relation to a nearby, coastal place name. *Igluliup Sikua*, for example, refers to the land-fast ice off the coast of *Iglulik*, while the sea ice off the coast of *Avvaja* is called *Avvajap Sikua*.

Some *icemarks* are of great importance for multiple reasons. *Ivuniraarjuruluk*, for instance, is an outstanding ice formation that is used for navigation, to scan the surrounding area and to obtain fresh water:

> If you got carried out to sea on the moving ice, and you were carried out in this general area, the moving ice would hug that place as it moves out ... when the moving ice detaches itself from *Iglulik*, it will usually move right out to sea, and that also goes for *Ikiq*. In that area which we refer to as *Ivuniraarjuruluk*, when the moving ice moves out, it will always rub through that place. This is when the wind is not blowing from *akinnaq* [west, northwest] (Louis Alianakuluk, 2001).

As noted above, *Ivuniraarjuruluk* is not only used as a navigational aid when hunters are carried away on the moving ice. Alianakuluk refers to that feature as a good and useful place: "As it is usually high from pressure ridges built up, it is a good place to scan the surrounding area, it is useful as it is pressure ridge built up, a good place to scan with your telescope. This is also a place where you can get unsalted snow, it is a useful place" (2001).

All the place names attributed here to ice formations are descriptive, either of the structures themselves or of their relative positions. It might be argued, then, that some of these names are mere descriptions of ice conditions. However, these names are widely known in the community and, more importantly, people attach to these names concrete

and consensual geographic locations. Besides, place names related to land formations among the Inuit of Igloolik are also frequently descriptive. It is important to highlight that the list of names given here as well as the ice formations plotted are not exhaustive. A broader project focusing exclusively on sea-ice topography would certainly provide more information regarding the knowledge of the ice environment in the community of Igloolik.

The ice topography is the consequence of recurring factors and it is the understanding of these factors that makes the topography predictable and, therefore, a place that someone could call *home*. Dealing with the moving ice presents different challenges and also implies an understanding of the complex relationships.

The moving ice

If the location of the camp at *Agiuppiniq* was related to some stable topographic feature of the ice, the location of the other two settlements, *Pingiqqalik* and *Uglit*, were connected to an opposite condition: the changing but predictable nature of the moving ice. People who in late winter and throughout the spring moved to those camps were looking to take advantage of the moving and fertile "land of the walrus" (see below), which was brought in and taken away again and again by the tides and the wind.

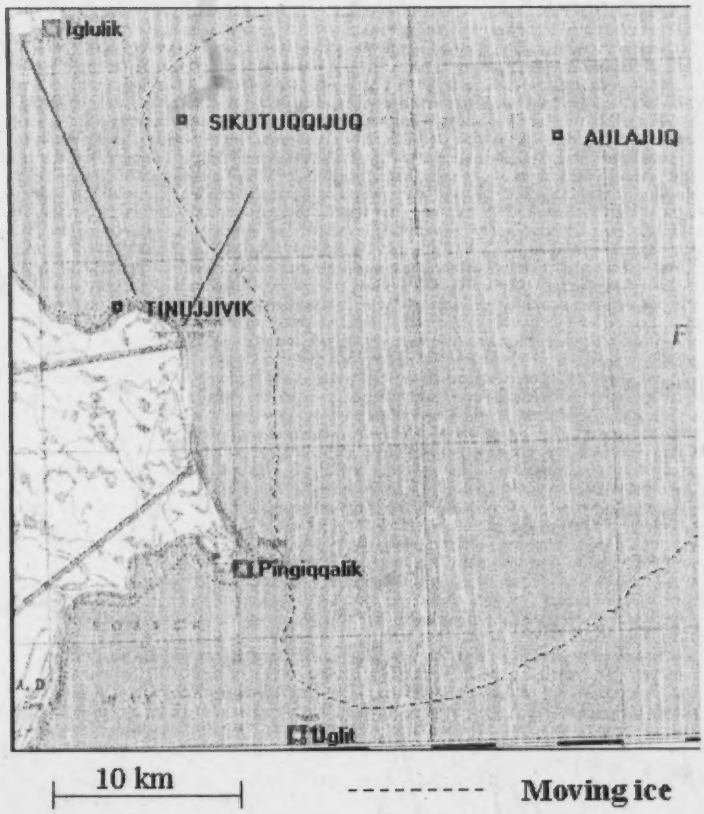

Figure 3-5: Iglulik, Pingiqqalik and Uglit

Parry describes in his journal how, in March 1823, several families would leave *Iglulik* for *Pingiqqalik*, "where the walruses were more easily procured" (*ibid.*, 418), and where the snow-huts were built "on the ice in immediate contact with the beach and the open water" (*ibid.*, 424). When Parry visited *Pingiqqalik*, on April 2, the open water was about three miles from the camp. He describes how at the end of April some people would move to the shores of the small island of *Uglit* (*ibid.*, 428, 435) where they would be even closer to the moving ice where walruses abounded.

The *land of the walrus* is in fact a large aggregation of floating ice that moves with the tides and the winds back and forth within the productive polynya southeast of Igloolik Island. Life at *Uglit* and *Pingiqqalik* is frequently spoken of by contemporary Igloolik

elders. Noah Piugattuk, for instance, describes with detail how Inuit would favour both *Pingiqqalik* and *Uglit* over *Iglulik* when they wanted to hunt walrus in the spring, pointing out that the floe-edge was closer, especially at *Uglit*, where "the ice contacts are more frequent in comparison to that of ice edge located more towards the land" (1989). Referring to earlier times, he adds that "with the remains of the sod houses in *Pingiqqalik*, there is evidence that this location used to have numerous inhabitants same as it is with *Igloolik*. As well as *Uglit*, the islands. These locations were central habitats" (1989).

The relative positions of the traditional camps of *Iglulik*, *Pingiqqalik* and *Uglit* are directly related to the whereabouts of the moving ice. The Iglulingmiut are widely known for their familiarity regarding the moving ice, in the sense that they have regularly hunted on it and have an understanding of its codes and of the factors involved in its movement.

This intimacy with moving ice involves both knowledge and respect. Aipilik Inuksuk warned that the moving ice is not a good place to live: "It is not a very good place to be in and you can never relax and you have to be ready to escape to more stable ground" (1988). At the same time, however, a good hunter would feel safe while being in such a potentially dangerous place because, if he pays attention to all the factors, "there is absolutely no concern about the dangers regarding the ice" (1989). A competent moving-ice hunter, then, can be defined in this context as someone who understands the factors involved in the movement of the ice and who is patient to wait for the right conditions. "It is never safe when people are impatient to use the ice when it is newly formed. As far as anyone can remember people have had accidents on ice due to their impatience and I have known cases of accidents that happened regarding the water and the ice", concluded Inuksuk (1988).

Richard Nelson's notes on the Inupiat of Wainwright, Alaska, permits comparison with another group also orientated to sea-ice hunting. After stating that most hunting and travelling during the fall, winter and spring is carried out on the solid land-fast ice, Nelson points out that "seldom do hunters venture onto the mobile ice pack beyond its

margins ... too many times in the past men have gone beyond the floe and become trapped on a drifting floe when the wind or current carried the ice away, opening a wide lead which prevented their return to the land" (1969, 33).

In contrast, Igloolik hunters have regularly practised hunting (mostly walrus hunting) on the moving ice. In the words of Theo Ikummaq, "Igloolik is unique in the Baffin region, where we are the only ones who go out onto moving ice to hunt for walrus. Maybe Repulse does it. Hall Beach does it also, but not to the extent that we do" (2000). Through generations of careful observation, Igloolik hunters have developed the knowledge to predict the changing behaviour of the moving ice. This knowledge is learned from a very early age, beginning with the icing process of lakes and rivers, and finally on the moving ice itself. Aipilik Inuksuk remembered his learning experience:

> [W]hen I was a child I was taught about the ice conditions of the lakes and ponds. I was told that the newly formed ice on the lakes are very hard to crawl out from. This is what I learned when I was a child but it was later on when I was out hunting with the men when I was taught about the moving ice conditions. To this day it seems that I have never really understood the moving ice and its nature (1988).

Although the factors related to the moving ice are many and their relationship complex, it can be said that, along with the topography of the coastline, there are two main factors hunters consider before venturing on the moving ice: the wind and the tides. The tides, in turn, are connected to the time of the day and the phases of the moon. Not everyone ventures to the moving ice nowadays in Igloolik, but there are several people (including some young hunters) who have the knowledge and skills to do it. Furthermore, hunting at the floe-edge also requires an understanding of the ice behaviour.

The following description of the role of winds and tides in the behaviour of the moving ice is based on my observations during a trip to the moving ice with Maurice Arnatsiaq in

March 2001, as well as interviews and conversations with Louis Alianakuluk, Theo Ikummaq and George Qulaut, and draws on interviews of the Igloolik Oral History Database with Noah Piugattuk and Aipilik Inuksuk.

The winds:

This article will not discuss Inuit knowledge of winds in detail (see Fortescue 1988 and MacDonald 1998). It is sufficient to know that the Inuit of Igloolik designate four primary winds: *Uangnaq* (WNW), *Kanangnaq* (NNE), *Nigiq* (ESE) and *Akinnaq* (SSW) (MacDonald, 1998: 181). MacDonald points out that these winds constitute two pairs of counterbalancing winds, "one on the Uangnaq-Nigiq axis, the other on the Kanangnaq-Akinnaq axis" (*ibid.*). He also points out the symbolic value of these opposites, especially in the pairing of Uangnaq and Nigiq, which "are said to retaliate against each other" (*ibid.*). As I will show now, this opposition (and the understanding of its occurrence) goes beyond the symbolic to play a leading role in predicting the mood of the moving ice.

The influence of the wind in determining the location of the floe-edge can be observed from the community of Igloolik. When the prevailing wind *Uangnaq* (WNW) blows, the phenomenon known in Inuktitut as *tunguniq* (reflection of the open water in the sky) looks well defined, occupying a good part of the southeast horizon, indicating the proximity of open water. On the other hand, when *Nigiq* blows, the reflection is barely visible on the horizon, which means that the open water is further away.

On 1 April 2001, Louis Alianakuluk described the conditions of the moving ice as follows: "[W]hen the *Nigiq* wind blows, it blows in the moving ice to the edge, now today, it is certain that it is iced over from the moving ice. Then in alignment of that strait the ice tends to part as well. That is the way it is" (2001).

People hunting from the floe-edge, then, wait for *Uangnaq* to blow, while hunters wanting to hunt on the moving ice rely on *Nigiq*. Generally speaking, then, we can say that a northerly wind will carry the moving ice away while a southerly wind will bring it

back. For the hunters residing in *Uglit* and *Pingiqqalik*, on the other side of the polynya, the situation is reversed. When asking about the influence of the winds on the moving ice, it is therefore important to know *where* the speaker situates himself in his speech. Aipilik Inuksuk described the moving-ice process from *Iglulik*:

> The north wind [*Uangnaq*] causes the ice to break up and drift away. After the wind, the weather improves and the area that was left by the ice freezes and that is the time when the current will move the ice back and forth to each other. That is the time when it is the least dangerous to hunt. "Agliurisimajuq" (That is even when there is a south wind [*Nigiq*] the ice still moves back and forth to the main solid ice.) That is the time when you can hunt without too much worries about drifting away. The wind will cause the ice to move together then it will start to drift apart and that is said to be the best time to hunt. This is true and that is the nature of the moving ice (1988).

Therefore, the northerly winds that take the moving ice away from *Iglulik* bring it closer to *Pingiqqalik* and *Uglit*. Noah Piugattuk remembers that when northern winds blew at *Pingiqqalik* it was "the prime time to hunt walrus" (1989). That was the time when the moving ice was in a position to make contact with the land-fast ice. The hunters at *Pingiqqalik* would wait until the northwest wind (*uangnaq*) shifted to northeast (*Kanangnaq*); that was the time to move onto the moving ice. Noah Piugattuk remembers a revealing story from his times at *Pingiqqalik*, "when the sun was higher" (springtime):

> When they wake up, it was a customary practice when one woke up the first thing was to step outdoors and relieve bodily fluids (urinate). As it was a custom to step outdoors and advise the rest that the winds were blowing from the easterly directions. He will say that the winds have shifted from northerly to easterly

directions. The winds are blowing in line with the shoreline from the direction of the northeast. He comes out with this wind direction. The person may be a male or a female. The small lake that is located near the sod houses is shaped so it faces the northerly, it is little long and follows the direction of northerly position. They call the little lake *Qukturaaq* (thigh) when the person goes out and observes the winds. The wind is coming from the direction of the moving ice. This means that the moving ice will land at the fast ice. When he gets back indoors he will announce the thigh has been broken, the person may be a male or a female. If that person was one of the elders he will announce that the thigh has been broken. Then at that instant the men immediately become lively in anticipation, knowing that the moving ice will make contact with the fast ice. This was measured by the lake, the winds were cutting across this little lake named *Qukturaaq* therefore they say the winds have broken the thigh (1989)

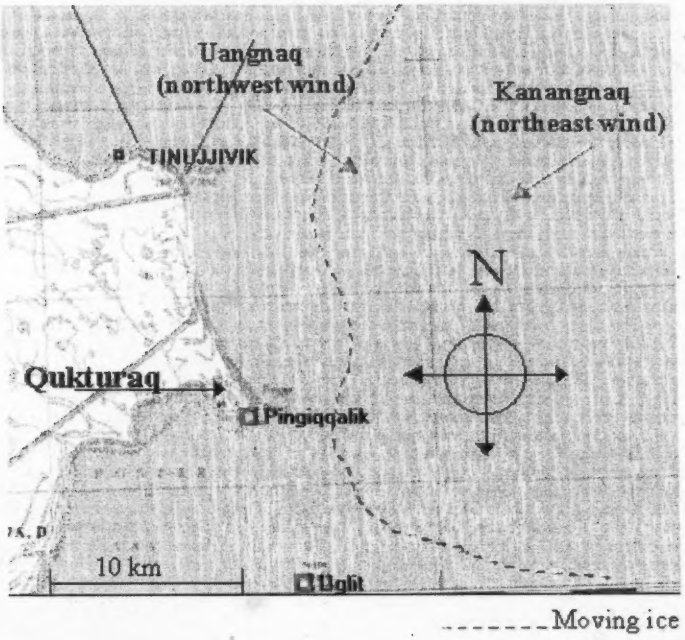

Figure 3-6: Lake Qukturaaq

Noah Piugattuk's story (also cited by MacDonald [1998: 180-81] gives an indication not only of the role of the wind regarding the moving ice but also of a holistic approach that sees connections between the ice on the lake, the wind and the position and stability of the moving ice.

The wind, however, can be deceiving, and Noah Piugattuk warns about the dangers of entrusting one's safety to the wind direction:

> The two opposing winds, namely the south and the north. If the wind from either direction had blown for a prolonged period of time, then this will be followed by the shift of wind direction to the opposing direction and it will blow with force. Therefore, after the wind has blown from the direction of the moving ice for a period of time, it is with certainty that the winds will shift to the north, and thus the hunters were advised of dire consequences if

> they were to remain in the vicinity of the moving ice. The younger people were taught about the sea ice environment (1989).

In fact, all accounts from experienced hunters make it clear that paying attention to the winds is not enough if one is to safely venture onto the moving ice. As important as the wind is, tidal currents play a central role in determining ice movement.

The tides:

Winds are not always reliable indicators of the future behaviour of the moving ice. A sudden change in wind from *Nigiq* to *Uangnaq* would cause the ice to break and hunters would be carried away. The changing behaviour of the winds, then, makes it a risky business to go hunting on moving ice. It is for this reason that observation of the tides is essential. Louis Alianakuluk advises that hunters who plan to spend time on the ice must always pay attention to the tidal currents, especially in the winter when temperatures are at their extreme. "The ice tends to break off and detach itself from the land-fast ice," he says. "It is dangerous when you do not pay attention; it may even look as if it would not break off" (2001).

How are the tides understood and how do they influence the course of the moving ice? There are two main factors to take into account: the strength of the tidal currents in relation to the phases of the moon and tracking the timing of tidal shifts. On 3 April 2001, during a hunting excursion to the moving ice, Maurice Arnatsiaq made a hole in the thin ice with his *savik* (snow-knife) and lay down for several minutes, his eyes fixed on the water as he attempted to determine the tide. He later told me that we would not venture onto the moving ice because the tide was going to take the ice away some time that evening. The current was already going out.

Aipilik Inuksuk said that "in the morning when it is low tide then the rest of the day the movement of the current will be inwards towards the main ice. That is what happens. Sometimes before the movement of the current is inwards it stays still and there is

absolutely no doubt that you can make it to the main ice after hunting on the new ice" (1988). This indicates that when tidal and wind conditions are favourable, hunters can go onto the moving ice even knowing that the tide will temporarily drive the ice away from the land-fast ice (note: the technical term for this phenomenon—when low tides stay still—is "slack tide"). Aipilik Inuksuk, situating himself in Igloolik, described a common method to determine the current's direction and how the tidal currents develop day after day:

> You have to pay attention to the current, drop something to find out which direction the current is going, whether it is high or low tide. When it is low tide .. what does it mean? .... It means that you are moving southwards ... That is how the current can tell you. … see what time it is ... Nowadays we have watches ... so [we can] see what time the low tide had stopped. Before they had watches they used to use the daylight ... how dark was it when the low tide started to slow down. For instance it is nearly two so if the tidal current stopped at this hour then the next day the tide would stop at three. The tidal current is always moving ahead almost an hour every day … You always have to pay attention to the tidal current and mark the time when the current has stopped moving outwards and the time when the current started moving inwards. Always keep an eye on the tidal current (1988).

Therefore, the moving-ice hunters must know that the tidal shift "moves" ahead about an hour every day. However, knowledge of the tidal shift must be supplemented with the equally important knowledge of the tidal strength, as determined by the phases of the moon (for a more detailed study on the Iglulingmiut knowledge of the moon and other astronomical phenomena, see MacDonald, 1998). During an interview on 18 December 2000, Theo Ikummaq explained that

> if you look at the new moon, at nine o'clock in the morning the

> tide is going out. At three o'clock in the afternoon the tide is going in. The same thing with the full moon. The full moon and the new moon are pretty much the same, in that at nine o'clock in the morning the tide is starting to go out. I mean, away from the bay. And at three in the afternoon the tide is going in; it's rising. So it helps you to determine at what time you will be going to the floe edge, or it determines how long you can stay on the moving ice, from the phase of the moon (2000b)

It is important to make clear, again, that the conditions described by Ikummaq are only valid for the particular day on which he made that statement. Aipilik Inuksuk also pointed out that "when there is full moon or no moon at all then those are the times that the current is the strongest" (1988). As the moon moves towards full moon, therefore, the currents become stronger, but as it starts to wane the current slows down. "People sometimes get marooned on ice because of the strong current. When you are at the floe edge you should always watch out for the high or low tide" (1988.).

Hunters know with certainty that strong tidal currents will detach the moving ice from the land-fast ice. Noah Piugattuk says that "when in the full moon, when the currents pick up strength, it is predictable that it might break up the ice, causing some ice ridges when the ice pans were to gather which resulted in further break ups" (1989). The predictability of tidal currents gives the hunter assurance that, with the right wind conditions, even if he gets carried away on the ice, he will land again at a certain time of the day, when the tide comes in. Of course, it is essential that he observes the progression of the tidal shift. Furthermore, a knowledge of the strength of the tides in relation to the phases of the moon will help him assess the relative stability of the moving ice, by estimating the strength of the tidal currents. Table 1 shows a summary of wind and tidal conditions that are necessary to venture on the moving ice

From *Igloolik*:
. Wind: southern (*Nigiq*)
. Lunar phase: between the new moon and the full moon
. Tide: coming in
From *Pingiqqalik*:
. Wind: northern (*Uangnaq* shifting to *Kanangnaq*)
. Lunar phase: between the new moon and the full moon
. Tide: coming in
From *Uglit*:
. Wind: northern (*Uangnaq*)
. Lunar phase: between the new moon and the full moon
. Tide: coming in

Table 3-1: Required wind and tidal conditions for hunting on the moving ice

As the table shows, winds and tides must be understood in relation to the particular geographic location in which the hunter or traveler is located.

Terms for the moving ice:

The extensive moving-ice vocabulary developed by the Inuit of Igloolik is an indication of the knowledge and careful, long-term observation of its behaviour. The processes described by these terms are so complex that any attempt to classify them may result in oversimplification. While there are some terms whose meanings are easily translatable into English (e.g., *tuvaq*: land-fast ice) there are many others that can only be understood within the framework of the environment as a whole, including people's interaction with that environment (e.g., *tulak*: to arrive). In this section, I comment on a few significant terms. For explanatory purposes, I have separated the terms into four levels.

At the first level there are some general terms that can be easily identified with generalised non-Inuit categories, and that refer to the broad distinction between stable and moving ice. *Tuvaq* means land-fast ice while *Aulajuq* means moving ice. Between these two is *Sinaaq*, the floe-edge. At the same level, there are some words that refer to a subject (a person or an animal) coming from or going to the moving ice. *Tulak*, a concept applied in the context of marine travel, means "to arrive," and implies touching a solid object (being it land or land-fast ice). Noah Piugattuk says that the word *tulak* is used to describe the movement of marine animals off moving ice and the precise moment when they land on land-fast ice (1989). *Pijuk*, on the other hand, refers to the opposite action: to move onto the moving ice from the land-fast ice at the time when the two—moving ice and land-fast ice—make contact.

A second level of terms refer to several conditions and transformations which take place at the moving ice and the floe-edge. *Uiguaq* is a thin layer of newly formed ice that attaches to the floe-edge. With the stabilisation of the moving ice (in Igloolik, when there is a southeast wind), *Uiguaq* transforms into *Uiguaviniq*. *Uiguaviniq*, then, takes the place of *Uiguaq*, which "moves" further away from the floe-edge. These two conditions are easily identified. *Uiguaq* is generally a smooth, darker ice, while *Uiguaviniq* is whiter and has a build-up of ice ridges. The latter, of course, is much safer to travel on than the former. *Uiguaviniq* eventually becomes part of the land-fast ice.

A third level of terms refers to ice formations. At the floe-edge, for instance, *Uigutarniq* is constituted by small ice forms on the edge, usually extending a few metres from the floe-edge. *Tuggarniq* refers to ice cracks on the land-fast ice that are produced by the strong southerly winds that have blown the moving ice onto the land-fast ice.

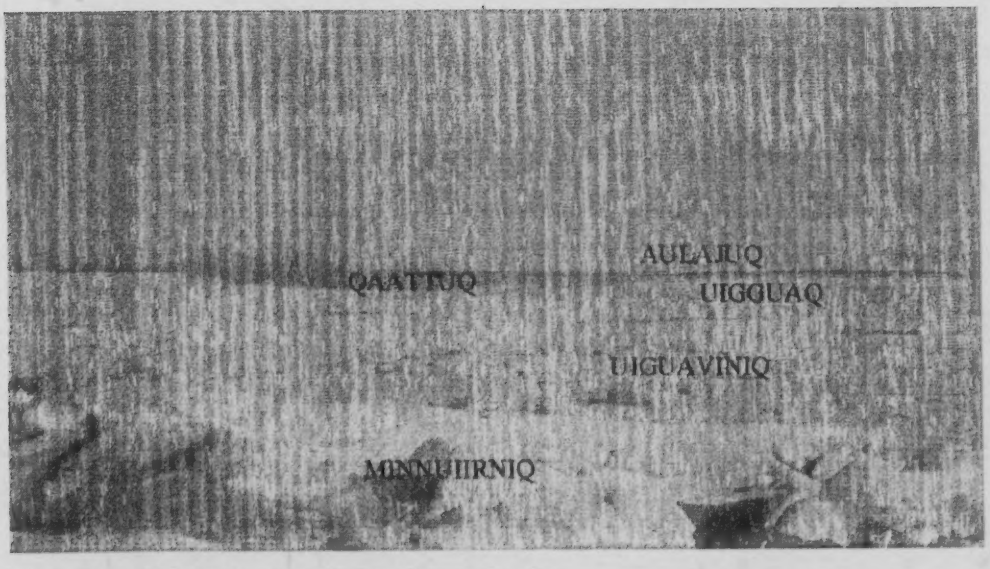

Figure 3-7: Terminology applied to the moving ice

Finally, at a fourth level, a few terms refer to the process of separation (see Figure 3-8). *Iriqqaaq* is the general name for the separation process of the moving ice from the land-fast ice. *Qaattuq* refers to open water along the edge when the moving ice moves from the land-fast ice. *Iriqqaarujjaujut* refers to the process through which soft, compacted snow known as *qinnu* begins to surface as a consequence of the moving ice separating from the land-fast ice (*qinnu* is usually known for presenting dangerous travel conditions). At the same level, a few terms refer to people's relative position at the time of the separation process: *qaajjujjaujut* refers to hunters caught on the ice when the moving ice separates from the land-fast ice, while *uukkarujjaujut* describes when hunters are caught on ice that has drifted away from the land-fast ice after a crack happens on the seaward side of the floe-edge. Both *qaajjujjaujut* and *uukkarujjaujut*, as well as *uukkaqtuq*, refer to hunters being taken away on the moving ice.

Tulak, as described above, means going from the moving ice onto the land-fast ice. A way of landing is to gain the solid ice through *ukkuartinniq*, which is a strip of ice that runs from the moving ice to the edge of the land-fast ice. A story by Emile Imaruittuq describes this process:

There is a saying in connection to this word. The boys had a task of blocking the entrance of the Igloo when they retired for the night. The word to describe this action is *Ukkuaq*. They were told to do it so that should they ever go adrift on the moving ice, they will be able to reach the land-fast ice through an *Ukkuartinniq*. When the hunters are out on the moving ice they are sometimes taken out on it away from the edge. In most of the cases, hunters will usually get on to the land-fast ice on these *Ukkuartinniit* (1990).

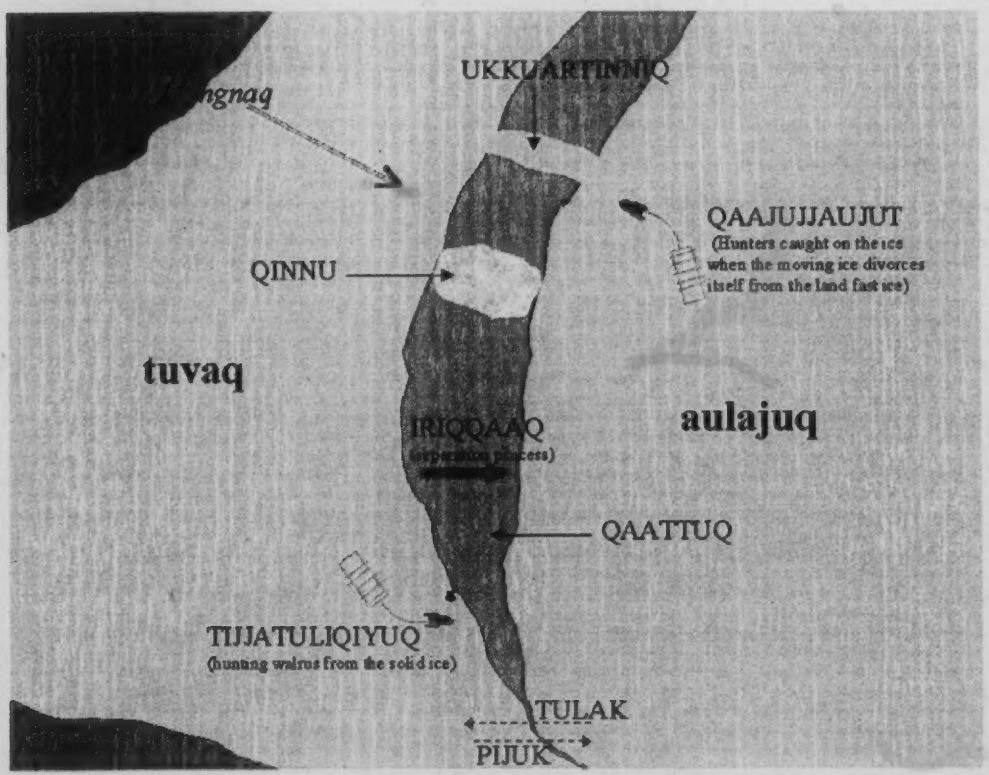

Figure 3-8: Moving ice features and processes

Recurrent features of the moving ice:

In the same way that many formations on the land-fast ice are recurrent, the moving ice can be spatially identified and located, although only an animated map could illustrate the process in its entirety. In fact, the very existence of *Iglulik* over a period of at least four thousand years (according to archaeological evidence) is directly related to the recurrence of the southeast polynya.

In his journal, Parry noted "a large extent of sea keeping open to the south-eastward through the winter" (1969, 418)—a clear reference to the southeast polynya. Contemporary Inuit such as Joe Iyerak maintain that open water and its associated features always recur in the same general areas (2000). *Sikutuqqijuq* (floating, young ice, where walruses are usually found) is an example of a place that can be identified and even plotted on maps (as Louis Alianakuluk illustrated in Figure 3-4), regardless of the course of its changing but predictable movements. The same can be said about *Sinaaq* (the floe-edge), *Aulajuq* (the moving ice) and even *Uiguaq*.

The changing nature of the moving ice can be understood and, therefore, predicted. This is the way Igloolik Inuit deal with the moving ice on a regular basis, managing and reducing risk to an acceptable level. As pointed out above, this knowledge is partially reflected in the development of an extensive vocabulary, created not only to describe the processes of the moving ice but also people's interaction with it.

The hunters' ability to predict the movements of the ice is manifest in Louis Alianakuluk's astonishing recollection of crossing *Ikiq* (the Fury and Hecla Strait) on the moving ice. The particular moving-ice conditions described in the story were not associated with a polynya but with the early stage of the freeze-up. It was a late-fall crossing in a portion of the strait that usually stabilises around Christmas. The crossing was about 30 kilometres and required overnighting on the moving ice:

> In fact, I took part once, that is, crossing the moving ice. From the north tip of *Nirlirnaqtuuq* to *Nuvuksirpaaq* the currents are stronger as it is almost in line with *Aukkarnirjuaq*. ... They can

> spend the night on the ice; indeed, they can make an overnight camp on the moving ice. This of course is made possible with dog team. I believe they used to make igloos from thin ice when they needed to spend the night out. It was not crossed every time, only on few occasions, we use to hear certain individuals having crossed the moving ice. This happens when the strait still had not frozen over, but is still moving (2001).

Louis Alianakuluk remembers that they used to hear people saying "*aulajukkuguuq ikaarqtut*" (it is said that they had crossed the moving ice): "There was a common phrase that goes '*ikiruuq nuqarttuq*' [it is said that *Ikiq* has stopped]. This meant that the moving ice was no longer moving" (2001). Although the crossing was done on rare occasions, probably associated with food needs, the trip reveals a deep understanding of the currents and, in turn, the hunters' faith in their predictive abilities based on the knowledge of relationships between tides, currents, coastlines and winds.

A holistic understanding

The extensive ice-related terminology, as well as the ice names, indicate a comprehensive understanding of the sea-ice features and behaviour. That is, the hunters of Igloolik not only remember recurring icemarks but also know why those icemarks are there. The formation and position of *Agiuppiniq*, for instance, is understood in relation to the currents coming from the northwest, and that current is in turn understood in relation to the position of the island *Similik* (Ikummaq, 2000a). It is also clear that hunters have decoded the sea-ice behaviour through their understanding of lunar phases, tidal currents and wind.

Inuit hunters would also predict a wind or tidal change by observing the behaviour of sea mammals. Noah Piugattuk points out that, in the spring, basking seals (*utaq*) were an indication that the water was no longer freezing (1989). The seals would stop going onto

the moving ice when the thinning ice was no longer able to support their weight. George Kappianaq says that "game animals are also used to determine what is to come ... The well-experienced moving-ice hunters, who have learned the conditions, used to say that when the wind had just shifted to the *Nigiq* direction, upon reaching the moving ice, they will discover that the walruses are not situated on the edge so they used to go deeper into the moving ice away from the direction of the land" (1997). A simple list of Inuktitut terms, therefore, says little about the Inuit understanding of the ice. Astronomical and biological observations are intrinsically linked to the knowledge that allows the hunters of Igloolik to exploit the moving ice on a regular basis.

The ice vocabulary recorded in my research reveals another particularity: the terms not only refer to ice states and processes but also to human interaction with the sea ice. That is why it is so difficult to merely *talk* (or *write*, for that matter) about this issue. The true nature of the ice can only be understood through a lifetime of apprenticeship. Careful observation, knowledge passed down from generation to generation, and the very experience of hunting, travelling and living on the ice completes this holistic approach.

The existence of verbs such as *tulak* or *pijuk*, and even others such as *tijjatuliqiyuq* (hunting walrus from the solid ice), reveals a point of view in which the environment is not viewed as a separate entity but rather in connection with the human experience of it. Compared to some western classifications of sea ice (see, for example, *WMO Sea-Ice Nomenclature*, 1970), the Inuit approach recognises the interaction between humans and environment in the process of naming the ice environment.

The knowledge of currents and tides also reveals another feature of this approach. It is not only what is seen that matters, but also what is not seen. While talking about navigation, Theo Ikummaq pointed out that "we teach the younger [hunters] what we see but also what is underneath. The dangers sometimes are below and you don't see them" (November 2000, fieldnotes). The knowledge of the currents underneath the ice will help not only in navigation but also in hunting. As Theo Ikummaq stresses, "How you are going to get that seal through a breathing hole is determined by what you know of what

the current is because that seal is going to be facing upwards towards the current. And then when you know that that seal is going to face upwards towards the current, you know where the seal is, so you know where to hit your target. And again, that's one of the reasons why we were taught to keep the current in mind always" (2000a).

The Inuit knowledge of the ice is not only visual. The ice can also be *heard*. Describing a failed attempt to cross the Fury and Hecla strait at the north tip of Melville Peninsula, George Qulaut said, "I knew that the ice further out was still going back and forth. We could hear a lot of movement, crashes ... It was almost like if the ground was shaking a bit, the ice was shaking a bit. We could feel it. The ice was breaking up at parts" (2000). George Kappianaq adds that when there are strong winds and the tides are coming in, the moving ice can be pushed towards the land-fast ice with such violence that it may cause the moving ice to raft. This violent movement produces streams of open water, making the area extremely dangerous for hunters. Kappianaq says that one can recognise this condition by the sound. The opening of the cracks caused by the tides coming in and strong winds is termed as *Qulluaq*, and can be recognised because it is accompanied by "the sound of boiling" (1997).

When the separation process takes place and the *qinnu* (soft, compacted snow) surfaces, the hunter taken by the moving ice can use that snow formation to *tulak* (land on the land-fast ice). According to Pauli Kunnuk, this is also a condition that can be identified by its sound: "One can hear it being crushed ... Even if the distance between the moving ice and the land-fast ice might cover some distance, as long as one can hear the *qinnu* being crushed, the sound which is usually not a crushing sound but something soft, one can travel on it" (1990). While hunting seals through their breathing holes in thin ice, the successful hunter will also rely more on his hearing than on his sight. Maurice Arnatsiaq says that "the hunter will sense the seal approach" (fieldnotes, 2001).

The nature of the understanding of the sea-ice topography is revealed in the hunters' knowledge of where the recurrent or multi-year ice comes from, as this observation made by Pauli Kunnuk illustrates:

> I do not exactly know where the multi-year ice comes from, that is before the multi-year ice passes through the *Aukkanirjuaq*. The multi-year ice that usually is seen where the walruses usually stay is more yellowish than the multi-year ice that passes through the *Aukkanirjuaq*, and sometimes one can tell that some of the multi-year ice comes from the direction of *Piling* which is rare, but it appears to come from that direction on rare occasion. These multi-year ice must be the ice that originated from our water, it does not appear to be possible that they would come from different locations like passing from Hudson's Bay, and in addition some of these multi-year ice appear to be huge floes (1990).

A hunter, therefore, must learn not only to identify recurrent features but also where these features come from, and why they recur year after year.

The sea ice in Inuit cosmology:

A comprehensive understanding of sea ice phenomena can be better understood if placed in the broader context of Inuit cosmology. Inuit in Igloolik frequently talk about the sea ice as having a will of its own. The sea ice is, after all, a changing environment whose moves must be respected but cannot always be predicted. Louis Alianakuluk states it clearly:

> Then it has been repeated from the people before us, that the floe-edge always wants to break off. For instance, the reason why it gets the urge

> to break off, is after there has been iced over for a prolong period of time, in fact it would have been long since there was an open water at the floe-edge. It is said that when it wants to break off, it will break off anywhere it so desires, especially when the tidal currents are strong during spring tide, even when it appears to be stable. It has been said that it gets the urge to break off, it gets the urge to become open water (2000).

Despite good understanding of the moving ice, accidents do occur. There are numerous stories of people carried away on the moving ice for days. Even experienced hunters like Nathan Qamaniq and Louis Alianakuluk (personal communications) have suffered the consequences of the changing mood of the ice, being taken away with the ice for days. This *urge* of the floe-edge to break off is evidence of the tremendous power of the tidal currents, and acknowledges the limits of human understanding and prediction of its movements. The dangers of the sea ice are not only related to the moving ice in polynyas but also to the time when the ice is starting to form. Emile Imaruittuq thinks that "there is a constant battle between the warm and the cold especially as the ice starts to form" (1990).

The personification of the sea ice, the recognition of it as having a will of its own, can be traced back to Inuit mythology. Knud Rasmussen expressed his surprise because among the Iglulingmiut, between the powers of *Arnaluk takanaluk* (the spirit of the sea), *Sila* (the spirit of the weather), and *Aningat* or *Taqqiq* (the spirit of the moon), it is the first that "plays by far the most important part in everyday life, and is, if one may use such an

expression, the principal deity, with power in some respects over both *Sila* and *Taqqiq*" (1929:62). In fact, Rasmussen says, the stories the Fifth Thule Expedition compiled from Igloolik show that, in contrast to other Inuit communities, *Sila* "plays a surprisingly small part as an independent force. It is altogether amalgamated with the storm, or foul weather … among the Iglulingmiut, it is the Spirit of the Sea which sends *Sila* to punish mankind" (ibid., 73). It is *Arnaluk takanaluk* that rules over *Sila*.

According to Rasmussen the spirit of the sea, *Arnaluk takanaluk* ("the woman down there"), was also known as *Takanakapsaluk* ("the bad one" or "the terrible one down there"). The power of the sea spirit can be easily recognized in the extraordinary strength of the tidal movements that will make the ice, as Alianakuluk pointed out above, break off *anywhere it so desires*. But men are not left alone in their battle with "the bad one." *Taqqip* (the moon) or *Taqqip Inua* (the moon's man or the moon spirit) is, according to Rasmussen, "the only good and well-intentioned spirit known, and when he does intervene, it is often more for guidance than for punishment … it seems almost as if he wished to protect the unfortunate or imprudent against the inconsiderate and altogether merciless punishments of the Sea Spirit" (1930, 74). The Moon Spirit, then, has some influence on the sea "as with the tides" (ibid.). The moon, regulator of the tides, helps men to predict the sea's violent moves.

The observation of the moon as a way to predict the sudden moods of the moving ice, is embedded, then, in pre-Christian Inuit cosmology. It is through the understanding of the environment as a whole that the hunters of Igloolik can venture, safely, onto the moving

ice, even when, as Noah Piugattuk said above, nobody can really claim to understand its true nature.

Conclusion

For a good part of their lives, the Inuit of Igloolik move across, talk about and live on the sea ice. In the past, the sea ice even constituted their home during part of the spring. It is not surprising, then, that they have developed a thorough knowledge of the ice, its nature and its processes. The ice topography is a changing but recurrent environment. Icemarks are familiar to most people in the community and some of them have names, as land features do.

The ice environment is constituted by both the semi-permanent and recurrent land-fast ice, and the changing but predictable moving ice. Confidence and competence to travel with minimal risk and inconvenience in that environment involves knowledge of the topographic features and understanding of the ice movement. This knowledge has been developed (and is still developing) and shared through generations.

The Iglulingmiut show a unique attitude towards the moving ice that combines respect and confidence to venture onto the ice even when the tide takes it away. Risk has been reduced to a minimum through an understanding of the processes involved in ice movement, and the patience to wait for the right conditions. This approach reveals a holistic understanding of the environment and the place of humans in it. It is an environment that is not conceived of as a separate entity, but one in which human interaction is always present.

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Chapter 4:

Routes, trails and tracks: Trail breaking among the Inuit of Igloolik[11]

Traveling was and still is a very important aspect of people's lives in the Inuit community of Igloolik, in the territory of Nunavut, Arctic Canada. In their movements, the Inuit of Igloolik do not randomly travel extensions of a monotonous landscape, as the Arctic tundra and sea ice are frequently perceived by outsiders. On the contrary, Inuit travel along well-known routes that belong to the individual and social memory of the people, and that are traced every year in the same general locations. Most of the routes used by the Inuit of Igloolik today follow very old courses, which have been known, transmitted and laid out on the snow year after year for generations. The knowledge of routes is learned either while traveling or through oral means. Some of these routes can be identified in the notes and charts of the explorers who visited Igloolik as early as the 1820s.

Except for the period of snow-free ground and open water provided by brief Arctic summers, travel is mostly performed over snow-carpeted land and sea ice, in the past by dog sled and in contemporary times mostly by snowmobile. Despite occasional markers placed along the routes, most trails are broken every year in a process through which the knowledge of courses materializes as snowmobile drivers move over trackless snow. Trails are constantly discussed in the community, and new trails are broken if people consider existing trails unsatisfactory. Today's trails are mostly related to caribou hunting and fishing on Melville Peninsula and Baffin Island, hunting seals and walrus at the floe-edge, hunting seals through breathing holes, and visiting relatives and friends in other communities. Since some of the trails are partially related to the patterns of the freeze up and the availability of animals, most people use the same routes to the same locations at the same periods of time.

This paper analyzes the characteristics of routes traditionally used by Inuit of Igloolik, and explores the differences between land routes and sea-ice routes, the role of the *trail-breaker*, and the characteristics of oral descriptions of routes. Finally, it addresses the issue of how the perception of trails is changing due to generational differences and the use of new transportation technologies.

Methodology and objectives

The current settlement of Igloolik is situated on the island of the same name located in northern Foxe Basin. Archaeological evidence shows that Northern Foxe Basin in general and Igloolik island in particular have been preferred places of human residence for more than 4000 years (Maxwell 1984). The present-day inhabitants of Igloolik are descendents of those who brought the Thule culture into the area around the twelfth century A.D. (Mary-Rousselière 1984: 431). Both oral and written sources describe Igloolik and its surroundings as one of the most important settlement areas in the semi-nomadic life of the inhabitants of the region (see, for instance, Lyon 1824: 217, 284). Mobility and residence patterns of the Inuit of Igloolik have changed over time, but it is agreed the Aivilingmiut of southern Foxe Basin and Melville Peninsula, the Tununirmiut of Northern Baffin Island and the Iglulingmiut of Northern Foxe Basin are closely related (Mathiassen 1928: 1). Mathiassen pointed out that "a movement between these areas is constantly going on, with the result that their population is constantly changing in number and composition. That a man is an Iglulingmio as a rulè means nothing more than that for the present he is living in the Iglulik area" (Mathiassen: 1928: 21). The establishment of permanent settlements was a turning point in the lives of most Inuit, as by 1960 "the entire Iglulingmiut population was quickly pulled into the settlements of Igloolik and Hall Beach" (Rasing 1994: 273).

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[11] A version of this chapter has been accepted for publication by Études/Inuit/Studies.

Igloolik has experienced rapid population growth and it is undergoing continuous changes, notably since it became one of the regional administrative centers of the new territory of Nunavut in 1999. Despite all the changes, however, subsistence hunting and fishing continue to be among the most important activities of the community, both in social and economic ways.

The island of Igloolik is relatively small (approximately 18 by 9 km) and the highest topographic feature is a hill that stands 57 meters above sea level. While there is some hunting of sea mammals at the southeast polynya and on the sea ice, most hunting and fishing are carried out at different locations situated between 30 and 200 km from the community. Low topographic features make navigation quite challenging in some parts of the territory, and traveling frequently involves long crossings of frozen sea and tundra, as well as courses through more prominent topographic features, such as valleys, river bends and canyons.

This work focuses on the spatial characteristics of routes, and analyzes how and why people recreate these routes year after year[12]. It also explores how the specific routes in particular and traveling in general are so central to the lives of the people of Igloolik. These topics have only been marginally addressed in the literature about Inuit peoples. Since traveling has been, and in many ways still is, one of the most important activities of Inuit daily life, the study of Inuit knowledge and use of routes, trails and tracks seems relevant in order to have a better understanding of how Inuit relate to their environment, and of the Arctic environment itself. Describing the Arctic landscape, Carpenter wrote that "[it] conveys an impression of absolute permanence. It is not hostile. It is simply there—untouched, silent and complete. It is very lonely, yet the absence of all human traces gives you the feeling you understand this land and can take your place in it" (cited in Lopez 1986: ix). One of the objectives of this paper is to show how the Arctic landscape in which Inuit live is actually covered by human traces. Routes do not go from place to place through "no-man's land" (Crowe 1969: 29). On the contrary, routes

go through named features, across patterned snow, and along familiar horizons, all of which constitute the territory in which a good traveler always knows where he/she is.

The research upon which this paper is based involved extensive travel with Inuit hunters. During fall, winter and spring of 2000 and 2001, I participated in 30 hunting and fishing trips where we traveled by snowmobile (traveling a total of 2000 km), interviewed hunters of different generations, created a database containing 400 Inuktitut place names, and mapped 37 trails, of which 15 are traditional routes that have been used in Igloolik throughout generations. I used Global Positioning System (GPS) receivers and Geographic Information Systems (GPS mapping programs and *ArcGis* software) to record and interpret travels, place names, ice features and routes.

Most of the routes were recorded with a GPS receiver while traveling; others were drawn on paper maps or at a computer by knowledgeable hunters. Most of the interviews cited in this study were conducted in Inuktitut and translated into English. The interviews conducted by the author were in English or through an interpreter. This paper also relies on routes described or charted in ethnographic material (especially Mathiassen 1928 and Boas 1888), explorers accounts (mainly Parry 1824 and Lyon 1824), and autobiographies (Rowley 1996). It also draws from interviews of the Igloolik Oral History Database, a collaborative, on-going project run by the Inullariit Society of Igloolik and the Igloolik Research Centre. All the interviews cited in this work (including the ones I conducted) are part of the Oral History Project. The most valuable sources were self-taped interviews, in which elders were given a tape-recorder and freely discussed topics of their choice. Not surprisingly, most of these narratives contain copious geographic information, and some of them detailed descriptions of routes.

There are no studies specifically concerned with Inuit use of routes, but the significance of movement in different cultures, including Inuit, has been analyzed by several scholars. Nelson reflects on the Wainwright Eskimo's use of trails on the ice, pointing out that they

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[12] In the context of this work the term *routes* is used when discussing knowledge of courses that remain and evolve in the memoryscapes of the people, while *trails* refers to the physical manifestation of routes,

"usually chop and smooth a trail through the rough ice from the village to the edge of land fast ice. The trail is leveled with axes and picks," (1968:66) a practice that is not usually performed by the Inuit of Igloolik. Collignon points out that the Inuinnait perceive their territory as an ensemble of itineraries, and "as organized by a network of lines through which people and game move" (1996: 98, my translation). In his study of Inuit navigation in Igloolik, MacDonald states that routes and landmarks are "the very arteries and nodes, the topographical anatomy, through which Inuit comprehend the totality of their land and access its life-giving resources" (1998: 188). The importance of trails and routes in different cultures has been stated, among others, by Brody (1981), Lewis (1976, 1991, 1994), and Myers (1986). The Inuit Land Use and Occupancy Project (Freeman, 1976) and the Nunavut Atlas (Riewe, 1992) produced valuable maps showing traditional routes.

The spatial characteristics of Inuit routes, however, have hardly been a topic of interest for anthropological and geographic research. Such study reveals some significant features of the Inuit understanding of the Arctic environment, provides an indication of the history of land use in the area, and shows how verbal descriptions of the territory in particular and oral knowledge in general may remain unchanged or with little variation through time.

Characteristics of Inuit travel

Traveling for the Inuit is not a transitional activity of going from point A to point B. Life happens while traveling. Other travelers are met, children are born, and hunting, fishing and other subsistence activities are performed. Mathiassen suggested that the courses of traditional routes were not only related to the geographical characteristics of the terrain but also to the possibilities of hunting (Mathiassen, 1928: 99). Ijjangiaq (1990) described how when he was younger several families often undertook the long

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through the carving of sled tracks on the snow year after year and some times more than once a year.

trading journeys together, explaining that hunting and interacting with other Inuit were parts of the journey.

Failure to notice this particular approach to travel puzzled the explorer Parry, who could not understand how people who he praised as having such a great geographic memory could not agree in terms of distance between two places (measured in periods of sleeps or days' journeys). Parry pointed out that "they not only differ from each other in this respect, but the same individual differs from himself at different times" (1824: 251). A detailed analysis of the cross-cultural problems in the transmission of geographical knowledge has been published by Bravo (1996). Here, it suffices to say that Parry's informants may have had in mind different seasons of travel (a point noted by Parry). Most importantly, however, was the fact that while traveling was an activity in its own right for the explorer, the Inuit may have seen traveling as part of their daily lives. In fact, distance was sometimes referred to in a very loose way. Ilupaalik remembers that "they would not know by numbers as to how far it would be... If [a knowledgeable person] sent someone to a specific location, a location that is far... he would tell him to take along dog food with him. He knows that he would have to spend days out on this particular trip, because he [was told] to bring along dog food" (2001).

Traveling was not a transitional activity between one place and another, but a way of being. This approach to traveling can be seen in the terminology that the Inuit of Igloolik use when referring to travel and travelers (for a list of terms, refer to Appendix 5). As shown below, statements made by some Inuit elders reveal that the act of traveling from or to a particular location plays a part in defining who the traveler is. A person was not only identified by the place where he/she had been born, or was currently living (as the suffix "miut" defines), but also as regards the location to or from which he or she was moving.

The relationship between the origin of the trip, the destination, the traveler and the journey is quite complex, as the following statements of Igloolik elders show. Michel Kupaaq (1993) points out that the region around Naujaat (Repulse Bay) is known as

Kivalliq, and that people traveling in that direction "had always been referred to as Kivavattut." However, people returning from there were called Pijuat. Those terms are also mentioned by Hubert Amarualik (1994). According to Mark Ijjangiaq (1990) the route to Naujan was known as Kivavaq, and the journey itself as Kivavaan ("southbound"). Kupaaq (1993) also says that people living at the northern communities of Arctic Bay or Pond Inlet are known as Tauvakkua (meaning "those over there"), but those who travel up there are called Itivimiut ("overland people;" overland refers to Baffin Island), and those who are already on the journey are called Itijjaat (gone overland). Those returning from overland are known as Itivittut.

The fundamental importance that movement plays in Inuit culture can also be appreciated in Rasmussen's description of the ritual performed before a newborn child undertook his/her first journey. After describing the ritual and the prayer used for the occasion, Rasmussen says that "this was the child's first journey, and the little girl … had to be introduced to life by means of the magic formula here given" (1929: 47). Therefore, according to Rasmussen, being introduced to the first journey was, in a way, being introduced to life.

Why do Inuit travel?

The reasons for Inuit mobility have been frequently associated with the seasonal availability of food (see for instance Boas 1888, Mauss 1950, Kemp 1971). The Thule migrations, for instance, have been explained as related to scarcity or availability of food in relation to climate change (McGhee 1969). A complete description of the different motivations by which scholars have explained the migrations can be found in Morrison (1999). Subsistence plays indeed an important role in residence and mobility patterns. Both ethnographic literature and interviews with contemporary elders, however, suggest a much larger set of reasons for traveling.

Parry was perhaps the first to notice that subsistence was not the only motivation for Inuit movements when he wrote that "in these movements necessity may during the winter

have considerable share; but in the summer it is perhaps only the love of change…that can induce them to leave Igloolik, the shores of which there need be no hesitation in asserting would easily supply a population, even of Esquimaux, ten times greater than theirs with food in profuse abundance" (1824: 415). Other motivations cited in different sources are trading (Boas 1888, Mathiassen1928), marriage (Rowley 1996, Lyon 1824, Parry 1824), visiting relatives (Kappianaq 1995), geographic curiosity (Lyon 1824), exploration (Qulaut 2000, Ikummaq 2000a), and social pressure (Mary-Rousseliére, 1980). Nostalgia for a significant place is also an important reason for travelling, as "it is peculiar to the migratory habits of the Eskimo that almost without exception the old man returns to the country of his youth and consequently by far the greater part of the old people live in their native districts" (Boas, 1888: 466). Returning to the birth place, at least for a visit, continues to be a compelling reason for travel today (Qulaut, 2000).

Another reason for moving is given by Julia Amarualik, who explains that a former camp, Avvajja, was abandoned because "our elder Ittusarjjuat, just before he passed on, had made it known that this place had heated up from all the use; he wanted this place abandoned to give it a chance to cool down; it might be only for a year. That means no one was to stay there during that period, if they so wish they could come back and live there again" (2001). Qunnun also remembers that "in those days they used to get sicknesses when the land was occupied too long" (2001).

Routes as parts of the memoryscape

The term memoryscape has been coined by Nuttall to refer not only to the mere physical territory remembered by a particular individual, but also to the community's interaction with a place through time. Memoryscapes are constructed "with people's mental images of the environment, with particular emphasis on places as remembered places" (1992:39). This concept is rooted in earlier works of other anthropologists, such as Ingold, who states that "it is only by virtue of his belonging to the community that a person acquires a relation to a determinate portion of natural space" (1986:137), and Basso, who points out that through knowledge and memory hunters negotiate images and understandings of the

land (1988). I would add that memoryscapes are not static entities; on the contrary, the concept expresses both the permanence of memory through time and the dynamics of people's relationship with their environments. Memoryscapes are not transmitted from generation to generation as a mere corpus of geographical knowledge. As Ingold puts it "remembering is not so much a matter of calling up an internal image, stored in the mind, as of engaging perceptually with an environment that is itself pregnant with the past" (2000: 189).

The act of remembering as an engaging process with the environment can be clearly seen in the activity of breaking trails. One of the main differences between routes used by Inuit in the Arctic and those used by most cultures in other geographies is that in the Arctic, routes remain and evolve in the social and individual memory of the people, become visible only in certain periods as tracks on the snow, and disappear from the landscape as the seasons progress. Routes are, therefore, an important part of people's memoryscapes in Igloolik.

Inuit in Igloolik say that the routes they use today have been used for generations. This is supported by Mathiassen (1928: 99) and Boas, the latter who wrote that routes "are established by tradition and the Eskimo never stray from them" (1888: 462). The dramatic seasonal changes of the Arctic environment erase the trails year after year, and blizzards may do the same within a single year. The only permanent or semi-permanent features of routes are occasional markers, such as inuksugait (rock cairns; plural of inuksugak), rocks or other objects placed or left along parts of the trails, as well as natural features.

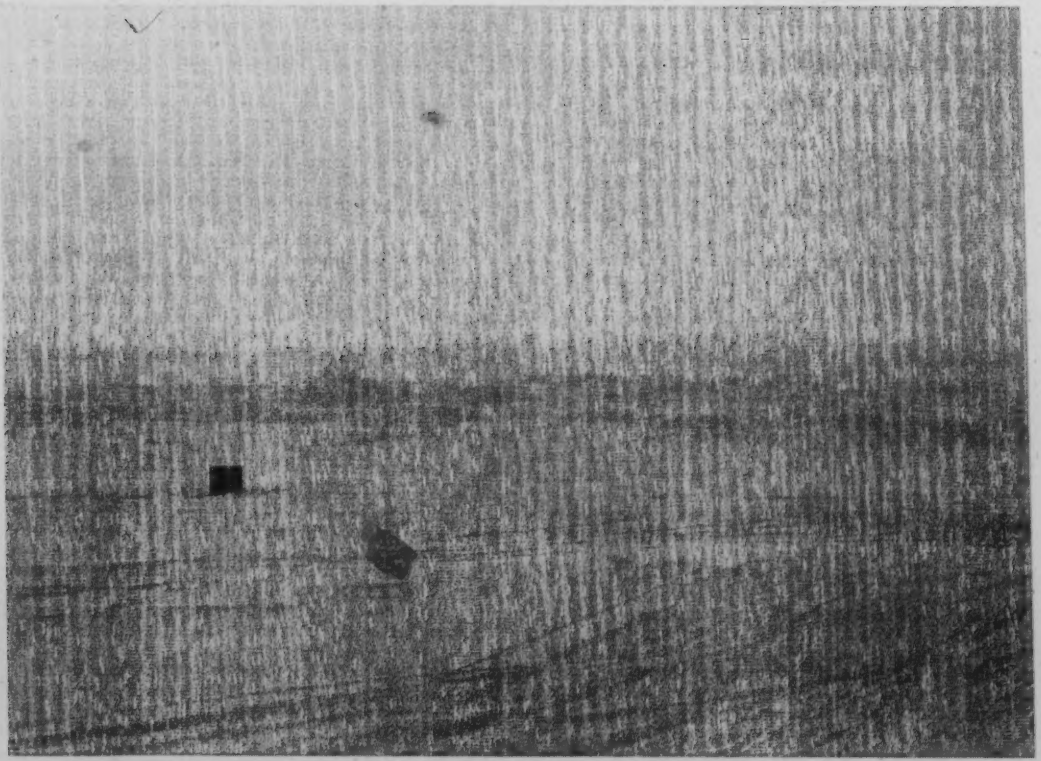


Figure 4-1: An oil drum along a land trail on Igloolik Island

Regardless of the use of occasional markers, most of the routes still followed in Igloolik are recreated from memory. A good indication of the historical continuity of routes is the description of the trail between Igloolik and northern Baffin Island, as provided by Parry (1969: 449-50), Hall (1864: 356), Boas (1888: 443), Mathiassen (1928) and Rowley (1996: 109). The descriptions indicate that the route went through the same locations from 1820s through 1930s. This route is still followed by contemporary travelers (Innuksuk, 1995). Similarly, the route between the region of Repulse Bay and Igloolik is described as going through the same locations by Rowley (1996: 67), Ijjangiaq (1990) and by Qulaut (field notes, 2000).

Among the routes that people consulted in this study considered as old, well-established routes, are the routes to Repulse Bay (Iyerak 2000, Ikummaq 2000b, Paniaq 2000), the routes to Arctic Bay and Pond Inlet, the routes to Steensby Inlet (Ikummaq, 2000b), the

routes to Majuqtulik (Paniaq, 2000), and the routes to the interior of Melville Peninsula (Aliianakuluk, 2001).

Routes as networks

Routes frequently present the most efficient ways (if not the shortest) of traveling between two places (MacDonald 1998:189). Since most people use the same routes, they become true networks of communication and exchange. People frequently meet along the trails and exchange news about travel conditions and about the places where they come from and the people they have seen. This communication network was of great significance in times before shortwave radios and telephones, since they provided an efficient way of receiving news about distant relatives and about the welfare of travelers encountered along the way. When meeting other travelers, people would also exchange essentials such as dog food, harnesses and seal oil (Rowley 1996: 217). In his detailed description of a trip from Lyon Inlet to Igloolik, Rowley says that one of his Inuit travel companions, Kutjek, predicted that they would "meet Inuit before dark because his ears were ringing. An hour or so later, we saw four komatiks in the distance" (1996: 186). Rowley points out that "for both ourselves and our dogs, meeting [this] party meant a change to feast from famine for they had plenty of meat" (1996:187).

This network was also reinforced through communal travel and through placing along the way caches with dog food for the return trip. An excerpt from a description of a route by Ijjangiaq (1990) suggests that in the times of dog sled traveling, the journeys would be actually divided into segments determined by caches of dog food. He says that in the trip to Repulse Bay, these locations were precisely determined, as the caches were set at a distance "of a full day's travel." The caches were buried along the trail in lake shores or at the bank of the river Ajagutalik.

This network is still important today, and people who meet *en route* invariably stop for a chat, a cigarette and sometimes a cup of tea. In the event of a break-down, it is also easier to meet with other people or to ask for help on the shortwave radio if the traveler is along

a known route. In the verbal description of his geographic location, the traveler would mention the route he has taken, refer to a nearby place name, and identify landmarks that can be seen from the trail.

An eventful trip I undertook with a hunter and his son during December 2000 provides a good illustration of the importance of traveling along known routes. During the trip, one snowmobile broke down and the other ran out of gas while returning to the community during the crossing of Ikiq (Fury and Hecla Strait). My Inuit companion used the shortwave radio to ask for help: he mentioned that we were in our way back from Saglarjuk and that we could see Imilik (an island located 18 km northwest of the community of Igloolik) in the direction of Uangnaq (the WNW wind). The call for help reached people in a camp on Baffin Island who in turn communicated with someone in the community of Igloolik, who finally phoned the relatives of my companion. Three hours after the radio transmission, they found us while walking to Igloolik along the trail. The description of the location was given verbally: throughout the process, no maps were used. Antonen Qunnun also says that to identify a specific location along a trail, "a place name is called out and your target location is [described as being] at its Uangnaq (WNW), or it might be at its Kanangnaq (NNE), Akinnangani (SSW), or to the direction of Nigiq (ESE); then you go and look for an object based on those directions" (2001).

Tracks, trails, routes, and the trail breaker

As pointed out above, trails have to be broken every year on the trackless snow of the sea and the land. After a trail has been broken, the wind will blow the snow that has not been compacted by the impact of the transportation device (most frequently sled runners), and the tracks become semi-permanent features. The landscape's surface becomes a historical record of the community's yearly trips, skills, mistakes, misfortune, and hunts. Sled tracks are frequently used as wayfinding aids since people remember and talk about them[13]. During a fishing trip in November of 2000, for instance, I lost sight of the hunter I was

[13] Following tracks can be deceiving when travelers have poor navigational skills, as it is easy to follow the wrong tracks.

traveling with during a crossing of Ikiq. I became momentarily disoriented and took the wrong bearing until I could find the tracks of the hunter that was leading the way. I was surprised (and embarrassed) when weeks later someone commented on having seen my erratic tracks. In another trip, during March of 2001, my travel partner recognized tracks we had left in a trip made during the previous December.

Given the importance of any sign of activity recorded on the snow surface, it is not surprising that the Inuit of Igloolik use different terms to name tracks and trails. The general term for trail is *Igliniq*, which refers to a trail that has been adopted by the community, is made of several tracks and is routinely used for travel. Usually *Igliniit* (plural) correspond with traditional routes (*aqutiit*). Louis Alianakuluk explains that "as soon as you hear this term [*Igliniit*], you immediately identify what it means; it means that it is a trail that is used; indeed, it is well trodden" (2001). *Iglinikuluk*, on the other hand, means "small trail," and refers to a trail made of a few tracks. *Inisiarpunga* is used to describe the act of following a lone track left by an occasional traveler[14]. *Iniit*, in turn, is the generic term for sled tracks (different from *tulliniit*, which refers to tracks or paths made by humans or animals walking).

Every year, in order for routes to become visible, someone has to be the first in breaking the trail. Louis Alianakuluk explains how travelers break the trail across the sea ice of Ikiq:

> When the strait becomes land-fast, someone will make the first trip across. And this first person that goes across leaves tracks in his wake, as he is the first to cross. Then after him, someone will follow these tracks, then again and again. Sometimes, if this track is going through unfavorable conditions, especially through ridges, a trail is going to be broken to make an *Igliniq* on a different route (Alianakuluk, 2001).

[14] The suffix *punga* refers to the first person of singular. The literal translation of inisiarpunga is "I have found a trail and I have followed it" (Michèle Therrien, personal communication).

The trail breaker, therefore, leaves a lone track, which will then be followed by other travelers, causing the track to become *Iglinikuluk* (a small trail). Depending on the characteristics of this trail, the *Iglinikuluk* will become *Igliniq* (a permanent, well traveled trail); otherwise a new, better trail will be broken. Alianakuluk points out that "I myself tend to cut through the trail in order to go straighter, especially when I see that the trail is curved when you feel that it should go straight". When the *Igliniit* are too curvy "I would just break trail and go for that direction" (2001). Ilupaalik points out that "sometimes you will see tracks all over the place … they are heading in the same direction, but the tracks are all over; they cannot be referred to as *Igliniq*. Only the trail that is constantly used can be referred to as *Igliniq*" (2001)

Sometimes, "bad" *Igliniit* will continue to be used throughout the year because "the raw ground is usually pretty rough in comparison to a well trodden trail which is nice and smooth" (Alianakuluk 2001). This was the case with the 2000-2001 trail between Hall Beach and Igloolik, which was considered by experienced travelers to be too curvy, but continued to be used as frequent travel had made it smooth and fast.

Trail breakers are usually experienced hunters, and frequently unnecessary curves of early trails are related to poor visibility, snow accumulation or, in the case of sea-ice trails, ice thickness and ice roughness. Alianakuluk comments on the 2000-2001 trail between the town of Igloolik and the floe-edge:

> There is usually more than one trail. For example, if we go down to the floe-edge this winter, I am not certain how many trails we have. The first trail that was broken happened when the daylight was still too dark, and it takes a [course] that goes well away from the [right] direction. Then I went out and took a route away from that *Igliniq* through a trackless ground, this is from Qikiqtaarjuk and on to the direction [of the floe edge] in a straight route, as it was my desire to take a short cut to the floe-edge. Later on, these tracks that I made had now become *Igliniq* (Alianakuluk, 2001).

Land routes

As stated above the term *routes* (*aqutiit* in Inuktitut) is used when discussing knowledge of courses that remain and evolve in the memoryscapes of the people, while *trails* (*Igliniit)* refers to the physical manifestation of routes, through the carving of sled tracks on the snow year after year and some times more than once a year. Figure 4-2 locates subsequent figures.

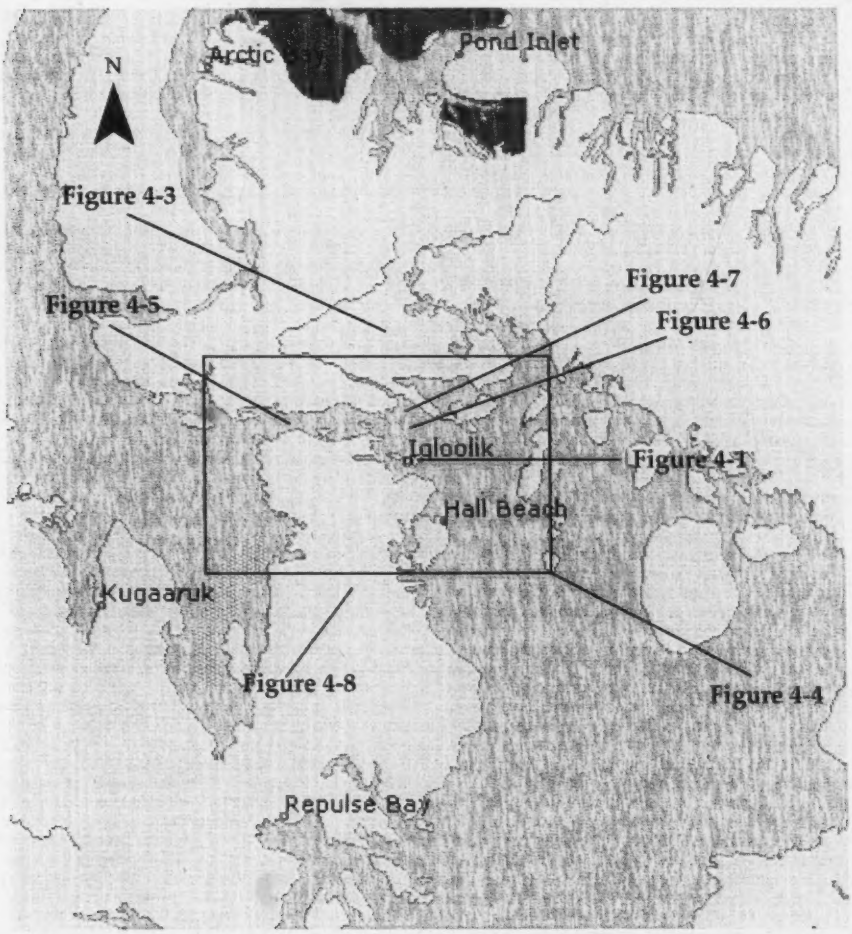


Figure 4-2: Location of subsequent maps and pictures

Trail breakers recreate the routes while remembering a previous trip or following directions given by another person. Land routes avoid rocky ground and favor isthmuses, fiords, and frozen lakes and rivers, which present the best conditions for easy, fast travel (fiords and isthmuses have been included here as parts of land routes because they frequently go several kilometers inland, and the surrounding scenery is similar to that of the land and quite different from the conditions of open sea-ice travel). In the past, smooth travel was even more important in order to preserve the shoeing of the qamutiit (sleds) and to avoid as much as possible the tiring and time-consuming task of re-icing the runners (MacDonald, 1998: 188). Ijjangiaq (1990) emphasizes that, on the way to Chesterfield Inlet, "they would have to follow the route as past Nagvaan the terrain is rough, so one must follow the exact route".

Breaking a land trail presupposes a deep knowledge of the terrain topography and, most frequently, of place names (see below) associated with topographic features. Travelers must be able to identify several landmarks, either along the trail or at the horizon. They must know what certain landmarks look like when approached from a particular direction. They must also notice changes in elevation, and in the characteristics of the ground underneath the snow. Travelers must always know the wind directions, and in cases of bad visibility or while traversing long extensions of tundra, they must read snowdrifts correctly.

All the characteristics of land trails explained above are illustrated in the following paragraphs, which contain excerpts from an oral description of the route between Igloolik and the Naujan (Repulse Bay) region. The route was described by Mark Ijjangiaq, an experienced traveler, to a younger hunter, George Qulaut, in 1990. According to Ijjangiaq, the trail was generally broken by a hunter named Aakuannuk, who "knew the area very well, so all of the others got to know the routes to take from him; indeed, he used to lead the rest of the travelers through the route" (1990).

"Once you get to a lake it will appear to you as this is the route to take, as it looks like a good route to take as the lake is large; on the side there is a small stream that runs into the lake; that is the only route you can take, there is no other way. You will go through this small stream until you get to another long lake, as a matter of fact this lake is known as Tasiraujaq .... After Sanningajuruluk the lake is called Tasiraujaq, just before the lake Qukiutitalik. This Tasiraujaq is a long lake so that you can go through it for a long time. It has been many years now that I did not use the route but I still remember the route. This stream is very short but there is a bend, despite the fact that the lake Tasiraujaq is only some short distance away. So as you go through the stream you will come across a sharp bend that will lead you to the lake ... this lake is not visible at all from the other lake that you are leaving behind, this is despite the fact that they are very close together...

... When you go through the river [...] Ajagutalik you will go through Sanguraq, of course this being the sharp bend, so you continue going through the river until you notice that the terrain and the land is getting bigger but it starts to get smoother; that is the Avalagiavvik or where you get off the river as you start for Nagvaaq.

Q. How should I be able to recognize Avalagiavvik towards Nagvaaq?

A: ... from Avalagiavvik, you will not come across any deep valleys, as you go along you will be going up hill and downhill very slowly, when you get closer to Nagvaaq you will see two big mountains which [are] located south of Nagvaaq which is higher than the rest ... Before you reach the end of the lake you cut across the north wind snow banks (Uangniutin) where the lake Tasiruluk is close ... the only problem is that there are quite a few rocks along the way to the lake, but that is not a threat in the early spring travel (Ijjangiaq 1990).

Additional aids for the trail breaker (and the trail follower, for that matter) are rock cairns (inuksugait) and other objects (such as oil drums) placed on the sides of the trail. The role of different objects placed along known routes has been also noted in other regions of the Arctic by Nelson (1968: 104) and in Igloolik by Mathiassen (1928: 97) and Lyon (1824: 219). Description of this method has been explained by Ikummaq (2000b), Qulaut (2000) and Hubert Amarualik (1994), among many other hunters in the community of Igloolik.

In sum, land trails go through the same general locations year after year. There may be exceptions related to travel in flat tundra, and trails broken during blizzards, or in dark periods. Across large extensions of flat tundra, for instance, there may be more than one trail, and bearings are usually kept through sighting of visible landmarks and the correct reading of snowdrifts. In general, however, the Inuit environment is not homogenous space, in contrast to how it has been described by some authors (Carpenter 1973: 8).

Land routes typically take long detours with the purpose of following smooth travel surfaces. Preference for smooth travel was already noted by Boas, who pointed out that sled routes would follow "a chain of long, narrow lakes" (1888: 450) as well as rivers and isthmuses (1888: 459). Ijjangiaq (1990) says that the route to take to Kivavaq "is not on a straight line; one would have to make a zigzag route." These features of land trails can be clearly observed in the routes recorded for this study.

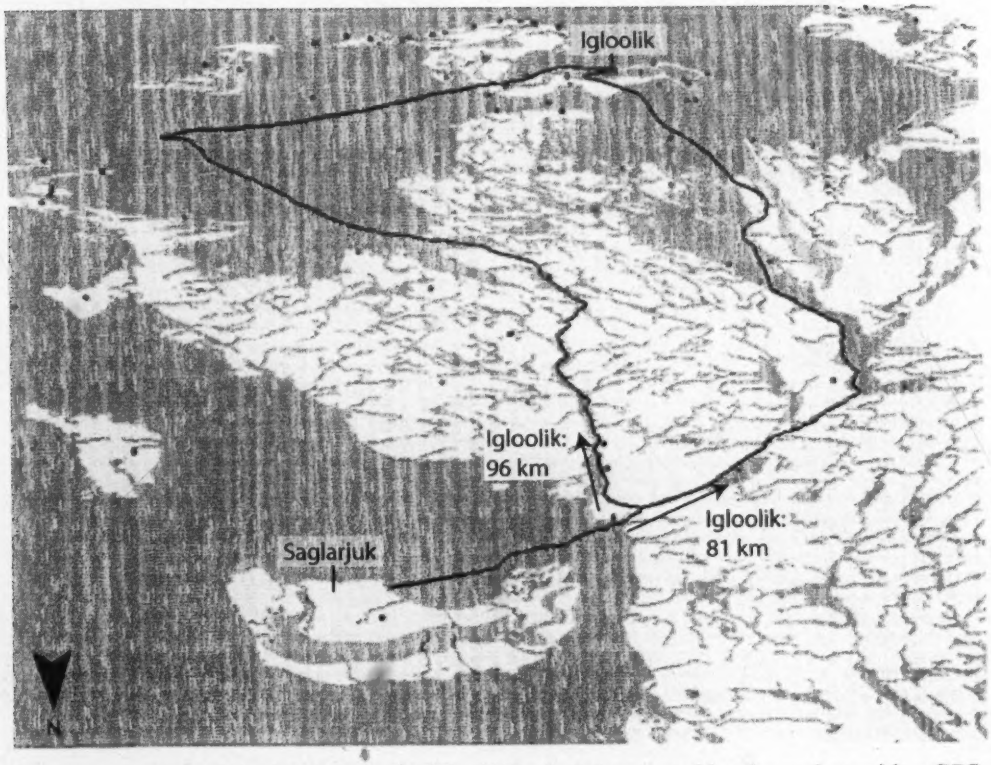


Figure 4-3: Two routes between Igloolik and Saglarjuk mapped by the author with a GPS in 2001. Dots represent places that have Inuktitut names.

The angle of view has been modified on this map to have a better impression of the use of lakes, fiords and rivers in these two land routes. The observer is situated above Saglarjuk, looking southward towards Igloolik. The trail on the left shows a detour between Igloolik Island and the mainland due to ice conditions at that time of the year.

Ice routes

In winter, little hunting and fishing is practiced within the limits of the island of Igloolik. Consequently, the crossing of the sea-ice is undertaken on a regular basis in order to access hunting and fishing grounds. Between the middle and the end of October, the community is confined for seven to ten days as the ice on Turton Bay is too thick for boat

travel and too thin for the sleds. The state of the ice is evaluated every day, and is constantly discussed on shortwave radio. A local hunter mentioned that, in December 2000, he would stand on the eastern coast of Igloolik every day to look at the steam coming out of the Fury and Hecla Strait (Ikiq), and he would also receive radio reports from a family living in an outpost camp at the other side of the strait.

There are several crossings that link the community of Igloolik to hunting and fishing grounds on Melville Peninsula and on Baffin Island. The first crossing goes to Naluqqajarviup Kangiqllua (Mogg Bay) in Melville Peninsula, and is used mostly for caribou hunting, fishing, and to connect with westward inland routes. Later in the year, a crossing from Igloolik to Utusivik connects with southward routes that lead to the neighboring community of Hall Beach, and also to Repulse Bay. As the ice stabilizes, other trails to the mainland are broken north of Mogg Bay. Another important crossing, linking the mainland with Baffin Island, is located on the northwest part of Ikiq, towards Majuqtulik, and is used mostly for caribou and polar bear hunting. Later in the year, a crossing located just north of the community towards Iqaluit Nuvua (the mouth of Gifford Fiord), allows travel to fishing and caribou hunting grounds on Baffin Island, and also connects with the routes to Arctic Bay and Pond Inlet. Finally, a crossing between Igloolik and Ikpiugalik leads to caribou hunting grounds on Baffin Island and connects with the route to Clyde River. During the fall-winter of 2000-2001, several dates related to sea-ice travel proved to be important:

October 19: last day of boat traveling.
October 27: Turton Bay was solid, and people started traveling regularly by snowmobile
October 29: first crossing to Mogg Bay
November 24: first crossing to Majuqtulik
Around Christmas: first crossing to Gifford Fiord
After Christmas: First crossing to Ikpiugalik.

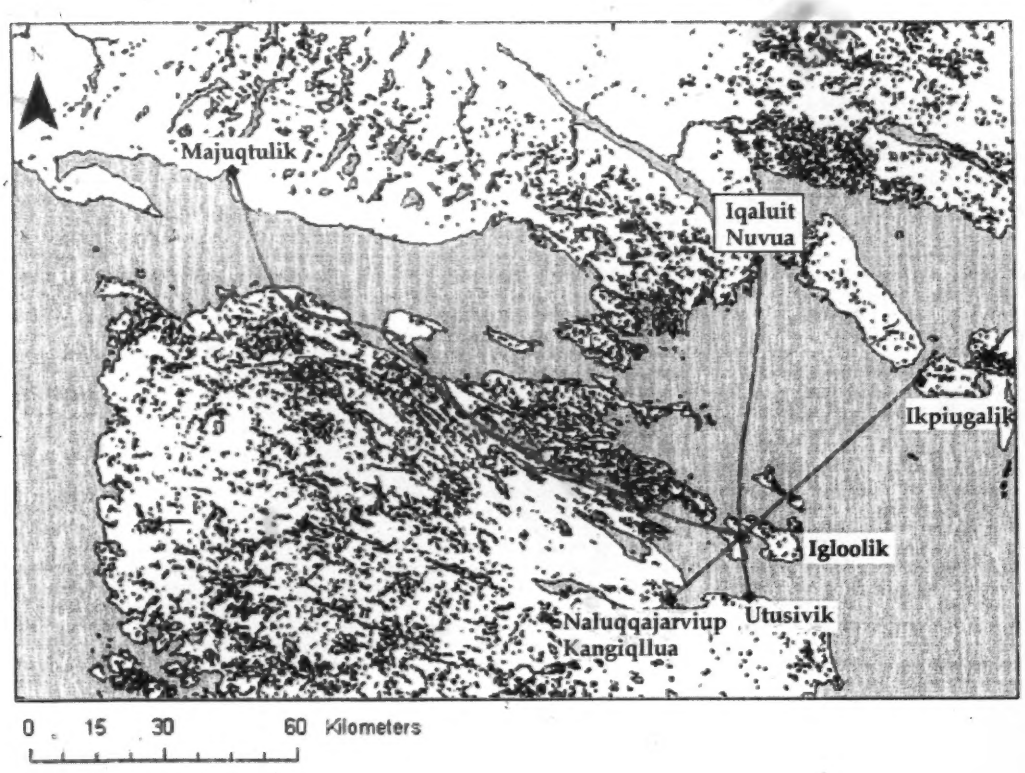


Figure 4-4: Map of the main sea-ice crossings

In November 2000, the first crossing to Majuqtulik was undertaken by George Qulaut, Louis Illupaalik, and Joannie Alaralak. The travelers used their shortwave radio to communicate the state of the ice and the details of the crossing. Their transmissions were eagerly followed in Igloolik. Qulaut pointed out that right after the crossing they built an igloo, "and we told everyone that we had crossed over to Baffin. We reported that it was extremely smooth ice … and they were all excited. And they started asking me about the ice between Saglarjuk or Salliarusiq, and if we thought it could be crossed over from Salliarusiq to Majuqtulik" (2000).

Sea-ice routes go over the same general locations year after year but vary considerably within the year due to the progression of the freeze up. The first routes taken when the sea ice is still thin are usually less efficient; they bend several times, as the trail breakers

usually seek the safety of multi-year ice. The main concern here is safety, and the crossing is frequently several hours longer than later crossings, which take place through straighter courses.

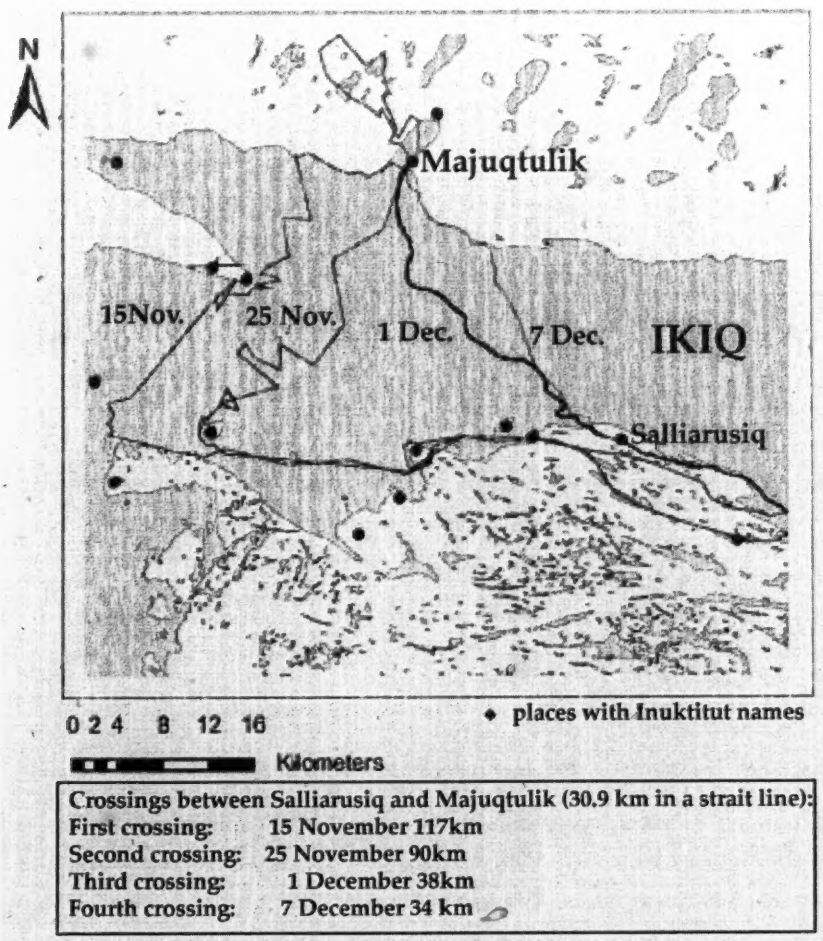


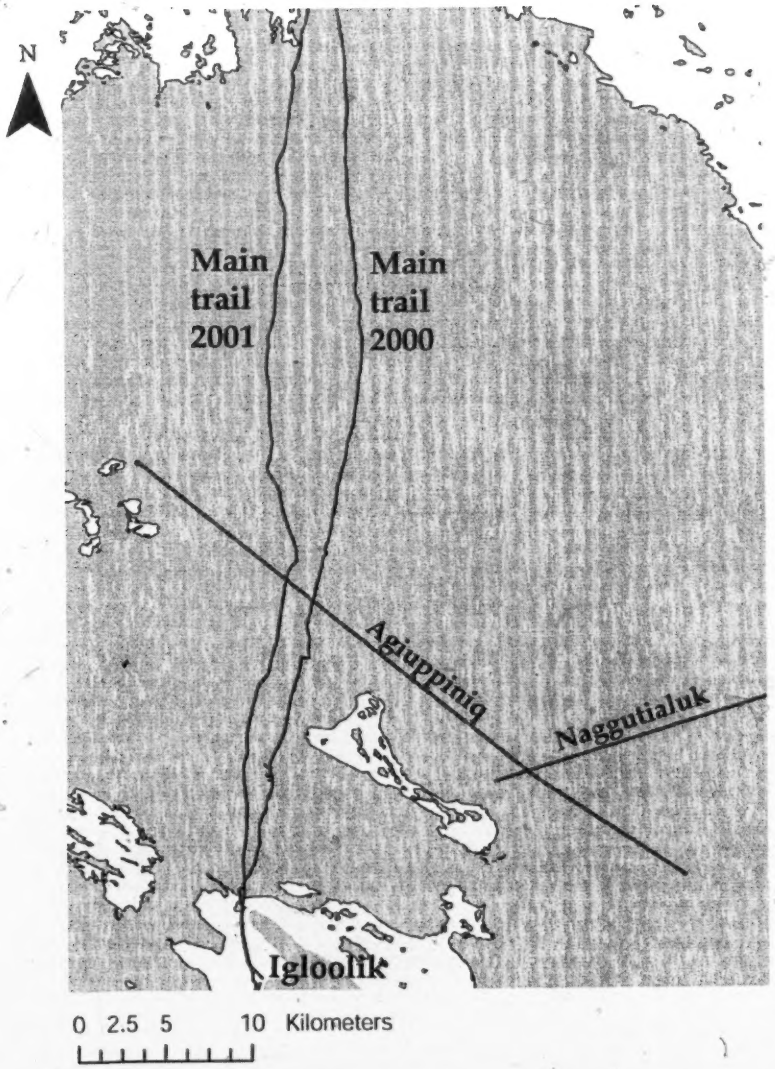
Figure 4-5: Four crossings across Ikiq during November and December of 2000. Dots refer to Inuktitut place names known to Igloolik hunters.

The first crossing (15 November, 2000) is described by Qulaut in the following manner:

> So we got onto the new ice... we checked the ice with the harpoon. [At the second attempt] I was able to puncture it. And it was safe for the skidoo to cross over. So we found a lot of aglus [seal breathing holes], and we lost maybe two seals, because the current was too strong. And I could see that further out into the sea, the ice was much thicker. So we went maybe two miles out, and we got onto the thicker ice, and it was smooth, all the way over to Baffin Island (Qulaut, 2000).

The topography of the land fast ice, however, may be quite similar from year to year. The main leads, cracks, ridges and areas of open water occur in the same locations year after year (a detailed analysis of sea ice topography and a preliminary description of sea ice routes can be found in Aporta 2002). By the time the ice becomes solid, routes across the strait become fairly similar from year to year. In Figure 4-5, the last crossing of that year (7 December, 2000) reveals a very efficient course, and constitutes the route that was finally adopted by most travelers. It is likely that this route maintains a fairly similar course from year to year.

Figure 4-6 shows that the 2000 and 2001 routes traversing about 50 km of sea ice between Igloolik and the Baffin Island coast towards Gifford Fiord are strikingly similar. The main reason for this similarity seems to be the recurrent topography of the ice, which in that area includes an open-water lead (Naggutialuk), a ridge (Agiuppiniq) and recurrent polynyas to the northwest and southeast of the map (Aporta 2002).



Main trail 2000: recorded with GPS by J. MacDonald
Mainl trail 2001: recorded with GPS by C. Aporta

Figure 4-6: Sea-ice trails from 2000 and 2001

During this long crossing across the strait, several markers, such as the one shown in figure 4-7, were observed along the trail. Most people consulted in this study did not attribute any navigational meaning to these markers. GPS readings of such markers,

however, indicated that some of them were located at turning points along the trail; these features might be the focus of future investigation. Even if these objects are not intentionally placed with navigational purposes, they are still markers that travelers memorize and may eventually use for description of the trail (John MacDonald, personal communication).

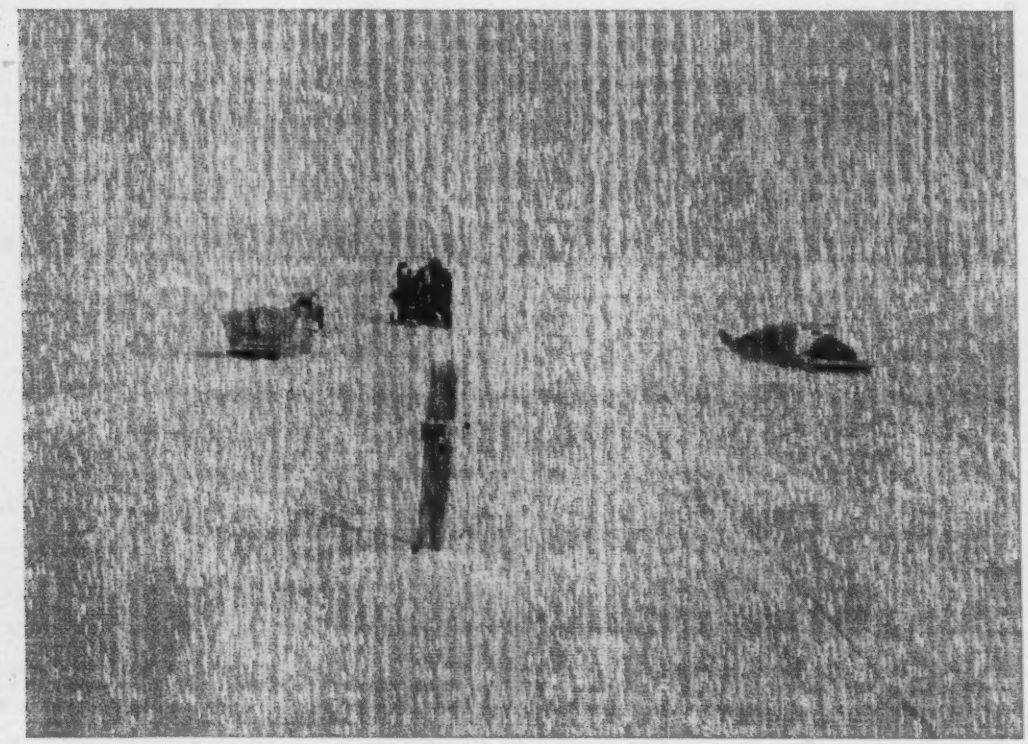


Figure 4-7: A marker on a sea-ice trail across Ikiq (the Fury and Hecla Strait)

Description of routes

As important as breaking or following a trail is the ability to describe the routes to other people and to understand descriptions made by others. In the past, maps were scarcely used in Igloolik, other than eventual drawing of ephemeral maps on snow or sand. Rowley (1996) cites several situations during the 1930s in which his Inuit travel companions used rough maps drawn on paper by other travelers who knew the routes.

Boas cites the use of maps drawn on the snow (1888: 643). The use of ephemeral maps has not been a regular practice in Igloolik. Innuksuk says that routes were explained orally, "but just once I remember someone drew a map [on the snow] of Piling area" (1995).

Nowadays topographic maps (1:250000) have become more common, notably among younger hunters. GPS units with map displays are also becoming increasingly popular, especially since the year 2000, when the Hunters and Trappers Association made available the *Garmin Map12* at a very reasonable price to Inuit hunters. MacDonald cites evidence of people who changed some traditional routes after having access to topographic maps and discovering a better route (1998:189). Older people, however, frequently travel without maps (see also MacDonald: 1998:199).

In most cases, regardless of the use of maps and GPS, the emphasis on verbal descriptions remains significant because telling the story of the trip is as important as the trip itself[15]. Routes are frequently described in the context of the narrative of voyages, a practice that in contemporary times is often performed on the local radio. Theo Ikummaq, for instance, pointed out that he spent two evenings on the local radio describing a trip he undertook from Igloolik to Greenland.

> Actually we had a radio show, a local radio, where we spent a couple of evenings, just talking about the trip. One of the elders doing the interview about the trip. And we didn't cover bits or pieces of the trip. We covered from day one, and we progressed. The way he asked the questions didn't allow us to jump from here to there. It made us talk from the day we left, the first few days, the next few days, and so on and so forth, to the point that half of the trip was covered one evening and the next half another evening (2000a).

[15] The narrative of the journey involves the sharing of knowledge, information and events, without which the trips lack significance.

Narratives are always chronological, describing distance in periods of time instead of space units. A route was customarily divided into sleeps or places where people would camp. Nowadays, faster transportation technologies have changed the rhythms of travel, and distance is frequently measured by fuel-tanks (Aporta and MacDonald, forthcoming). Hubert Amarualik says that before maps were used, directions would be given "about lakes, shape of land, land markers inuksugait, and everything that could describe the way. Nothing was written… Some people gave very detailed information that you could almost picture the place where you are going, even if you had not taken the route before, you would recognize the places that were instructed to you. When I was growing up and learning to go places that was the only way I learned to go places. Nothing was ever written or maps were not used" (1994).

Environmental psychologists Cornell and Heth define routes as "represented by more than lines. Routes are also hierarchical, with landmarks, bearings and actions embedded within segments, which are embedded within a larger spatio-temporal framework, defined by the beginning and the end of the trip" (1999:16). They also say that changes in surroundings help to define a sequence and that "nodes provide memorable endpoints for segments." Finally, they state than segmentation facilitates memorization, a point frequently seen in Inuit narratives of trips. In Igloolik, descriptions of routes are frequently divided into segments which usually start and end in named places. For instance, when asked to describe the routes between Igloolik and Saglarjuk, Qulaut said he could take four possible routes, and described one of them as follows. "If I take the Naluqarjarvik route, I will take the Naluqarjarvik, and on to Uigursiq, and from Uigursiq up to Avvajjaup Qinngua, and from Avvajjaup Qinngua to Itilliq, and then Saglarjuk, and then Salliarusiq. That's one route" (2000). Qulaut described the other three routes in a similar fashion.

In the narratives of journeys from interviews of the Oral History Project, routes are always described as going from one named place to another. Turning points of routes are frequently named places (see also MacDonald 1998:188). They may also be associated with the sight of a named landmark on the horizon. Ijjangiaq explains that the route that

goes to Repulse Bay follows for a long while a river named Ajagutalik. At one point the traveler must get out of the river to take a small creek. Ijjangiaq says that the place where one must turn "is called Sanguraq … then the place where you cut off from the river is called Avalagiavvik" (1990). Sanguraq is the name of a sharp bend in the river, and Avalagiavvik is a spot in the bend where the terrain gets wider and smoother. Both places are essential to recognize the continuation of the route, and both are named. The creek eventually leads to a lake named Nagvaaq. Alianakuluk also says that "if I was to make reference to the trail, and mention a place where it bends, then they know immediately what I am making reference to" (2001).

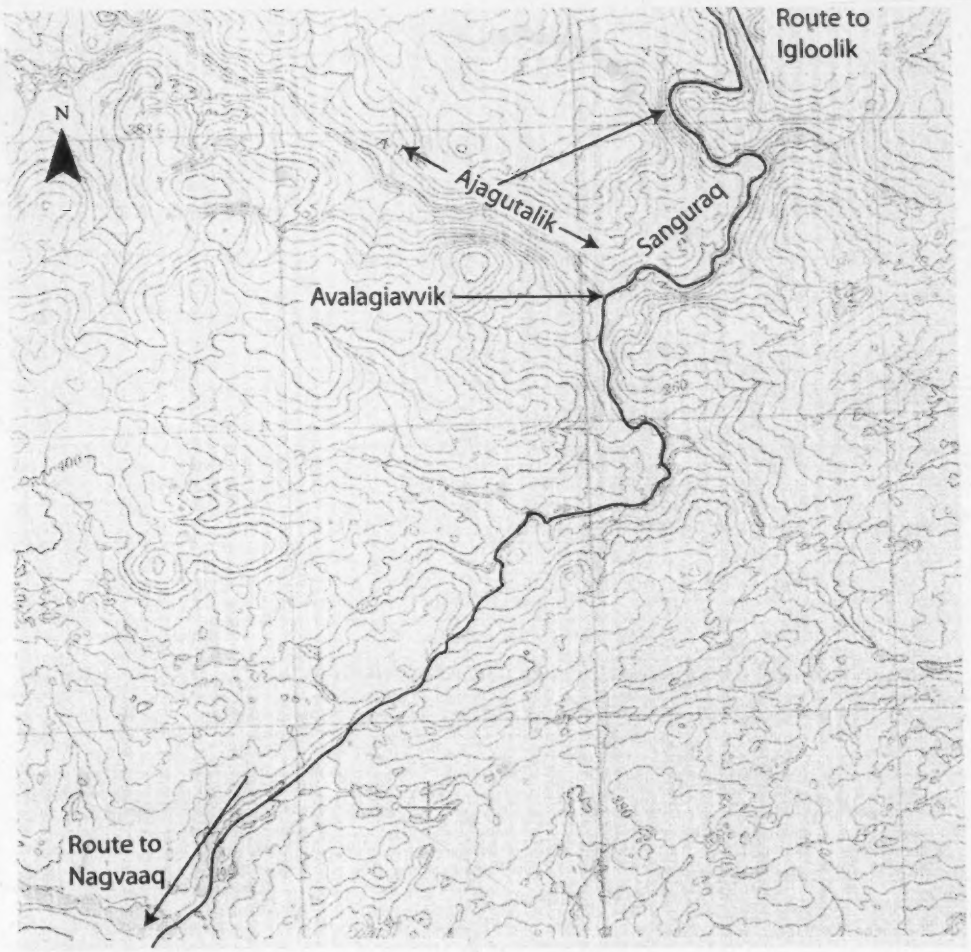


Figure 4-8: A segment of the route between Igloolik and Repulse Bay, as described by Mark Ijjangiaq.

All hunters consulted for this study agreed that place names are important in order to travel[16]. It is common for experienced travelers to ask their younger travel companions to point at named places during tea breaks along routes. Kupaaq pointed out that new names are sometimes created when new routes are used because "Inuit like to say where they are going, and even though the name of the place may not seem significant they are still a

[16] This seems to differ from how Inuinnait use place names, as described by Collignon. The author points out that for a good hunter/traveler "there is no need to name space to travel without getting lost" (1996: 115, my translation).

landmark; so that is why they are named... That is why places like Qalirusiujaq are named, so that people can refer to them" (1987).

Lakes and rivers are fundamental in determining courses of land routes (see figure 5-3), and many of these features are named[17]. A section of Ijjangiaq's route description, for instance, contains 24 place names, of which 11 refer to lakes, and 16 to inland water in general, as the following table shows:

[17] Collignon states that most of the land names collected in her project refer to lakes and that fewer refer to more prominent topographic features such as hills. The author concludes that this supports the hypothesis that, among the Inuinnait, place names are not related to traveling but to residence (1996: 122-3). In Igloolik, however, lakes and rivers are not only important for camping, hunting or fishing, but are also very significant components of land routes.

Tasiujaq	(lake)
Ajagutalik	(river)
Nagvaan	(lake)
Tasiraujaq	(lake)
Qukiutitalik	(lake)
Sanguraq	(sharp river bend)
Tasiruluk	(lake)
Tasirjuaruluk	(lake)
Kimaktuutim	(lake)
Ulualuk	(lake)
Kujjuaq	(river)
Qariaq	(inlet)
Angmaluttuq	(river)
Angmaluttuq	(lake)
Piringajuq	(lake)
Amittuarjuk	(lake)
Sanningajuruluk	(rough land at sides of the lake)
Avalagiavvik	(elevated, smooth terrain)
Akunniq	(point)
Usuajjuk	(point)
Igloolik	(town)
Nuvujjuaq	(land before Naujan)
Nagjuttuuq	(point)
Qupiruttuuq	(reference point to compare distance)

Table 4-1: Place names mentioned by Ijjangiaq

All the sea-ice routes recorded in this study reach land at named places along the coast. The single landing place of four trails recorded in the winter of 2000 between the island Saglarjuk and the northern tip of Melville Peninsula, is named Qakkiaq, which means "landing place." In the Igloolik area, shore profiles and hills can be spotted from far away, and they play a significant role in defining the location of routes and the areas where the routes bend. Collignon also noticed the use of named places along the coast as navigational aids among Inuinnait (1996:123).

The importance of place names in traveling has been noted by several authors. Lyon, for instance, points out that during long journeys weighty goods are "frequently left in store on the banks; and as every streamlet, lake, bay, point, or island has a name, and even certain piles of stones have also appellations, it is easy, in some ensuing year, to find the

things which are buried, or even to describe their situation to others. It is remarkable, that in enumerating the various sleeps, or days' journeys along the shore, every one has a particular name" (1824: 218-9). Arima adds that among the Caribou Eskimos "place names were most often featured in songs about travelling, with necessarily capable men undertaking long, arduous journeys and later singing about them" (1976: 218). Andrews, Zoe and Herter point out that in Dogrib cosmology, significant places - "represent the physical embodiment of cultural processes, which is realized though the combination of travel and story-telling. By traveling traditional trails, which link places like beads on a string, Dogrib youth are told stories as each place is visited" (1998: 312).

Traveling today

The patterns and extent of travel have changed over time. Parry pointed out that the most knowledgeable people of the Igloolik area were familiar with a territory of a "a distance of more than five hundred miles reckoned in a direct line [south-north], besides the numerous turnings and windings of the coast along which they are accustomed to travel" (1824: 513). By the time Mathiassen visited Igloolik in 1920s, trading had become an important yearly activity and long journeys were undertaken every year to the trading posts at Repulse Bay, Pond Inlet and Arctic Bay. Trapping had also become an important economic activity. Long journeys were certainly made in the pre-trading period, but with the establishment of the trading stations, these long trips became part of the yearly cycle of life. Mathiassen says that "at Pond Inlet I met a man who knew the whole of the country between Chesterfield Inlet and Ponds Inlet and had also travelled to Piling, North Devon, Cornwallis Island, North Somerset and Prince of Wales Island" (1928: 97-98), a territory of significantly larger proportion compared to the one described by Parry. Most of the contemporary elders of Igloolik took part in the long trading journeys, since the transformation in travel patterns due to the process of sedentarization did not take place in Igloolik until the late 1950s and early 1960s. Most elders in the community know the long routes to Arctic Bay, Pond Inlet, Repulse Bay and Chesterfield Inlet, and some of them know the route to Clyde River.

Long journeys to the communities of Repulse Bay, Arctic Bay and Pond Inlet, are still undertaken with the purpose of visiting relatives (Piugattuk 1989, Qulaut 2000, Kappianaq 1997, Ijjangiaq 1990). Air travel has contributed (as elsewhere in the world) to reduce distance between communities, but the high cost of plane tickets in the Canadian North prevents most people from using this means of transportation. Communication with relatives in distant communities through telephone and shortwave radio has decreased the need for actual travel, but people still enjoy the undertaking of long journeys during the bright and relatively warm Springs. Some Inuit in Igloolik make journeys to distant communities once or even twice a year (John MacDonald, personal communication).

One of the main restrictions to traveling today is related to life in town and the need to have part-time or full-time jobs and to attend school. Traveling is still an important part of people's lives, but the rhythms of travel are very different; people usually undertake their hunting and fishing trips during weekends, even in cases in which weather conditions are far from ideal.

Snowmobiles have almost completely replaced dog teams. The known disadvantages of snowmobiles related to expensive maintenance and mechanical failures, are compensated for by the speed and comfort they provide. On the downside, snowmobile travel results in a much narrower perception of the landscape since the traveler focuses mostly on the trail. The lower pace of a dog-sled allowed better memorization of landmarks and a view of the surroundings that was 360 degrees wide. Furthermore, the gentle pace and relative silence provided by the dog-sled allowed communication of geographic knowledge while traveling. MacDonald observes a similar situation regarding the transmission of astronomical knowledge (1998: 7).

The route between Igloolik and Majuqtulik was traveled by snowmobile in an average of seven hours in December 2000. In the past, travelers used to take between three and five days to reach Majuqtulik by dog team. Iyerak says that "if you are traveling fast you are

only looking right in front of you. You are not looking sideways or anything. But with dog teams you are always looking sideways, always, always. Not only at the front ... You can memorize all what you have seen and if you go in one direction you will have memorized what you have seen already and then when you come back you will know how it was" (2000). Dogs were also good at following well trodden trails and, in some situations, at orienteering in bad weather (Ikummaq 2000a).

My own observations and the opinion of experienced hunters in the community suggest that a large number of young people have become track-followers. They follow trails that have been made by more experienced hunters, and make frequent mistakes in well-traveled routes, including the relatively short route between Igloolik and Hall Beach, where most of Igloolik search and rescue operations take place. Young, inexperienced travelers also have difficulties to describe where they are on their radio transmitters in the event of a break-down. MacDonald describes a case where young hunters who ran out of gas after being lost in a blizzard, could not describe their location on their shortwave radio. "Whereas from their camp they could see familiar distant islands and points of land, under questioning by elders over the short-wave radio they were unable to name any of the observed features. Nor could they tell their would-be rescuers the name of the land last seen before the blizzard struck" (1998: 163).

Nathan Qamaniq points out that "when you are just following a trail you do not need to worry or work hard to reach your destination… [Younger people] only travel by following the trail to reach their destination. This slows the learning or getting knowledge about things that need to be known; this is taking things too easily; this is just following the trails or when you are on the sled being pulled by someone else" (2002). Younger people in Igloolik seem to be unaware of the existence of different types of tracks, and their terminology. Several younger hunters consulted in this study did not recognize the different terms described above. Louis Ilupaalik says that "whenever [younger people] see a track, even a single track … this person would refer to that as Igliniq; these are not what we would term as a trail, they are only tracks" (2001).

Trail-following, however, is not necessarily a passive activity. Good travelers would still pay attention at the landmarks and other navigational aids along the trail. As pointed out above, tracks can be suddenly covered by fresh or blowing snow, and sometimes sled tracks splitting from the main trail can be deceiving. A confident traveler may also leave a trail if he considers it unsatisfactory.

Skills at traveling and wayfinding, therefore, are still very important, socially valued, and a source of personal pride, in the same way that becoming lost is a source of embarrassment. During the course of my research in Igloolik I met several young people with deep knowledge of routes, place names, and who were confident at wayfinding. All of them spent most of their childhood and early youth hunting and fishing with relatives, and some of them used to live in outpost camps.

Conclusion

Despite important social, economic, and technological changes, traveling remains a significant part of people's lives in the community of Igloolik. When the snow covers up the land and the sea ice, travelers start breaking trails, some of which recreate routes that have been used by generations of Inuit. These routes belong to the memoryscape of the community of Igloolik, and their knowledge allows people safe and reliable travel to hunting and fishing grounds and between communities.

In a contemporary Inuit community, younger people are faced with skills, contexts, expectations, technologies, and geographies of a different nature. In this context, learning the local routes, place names and wayfinding techniques means much more than acquiring a body of knowledge. Remembering community routes is a process through which oral knowledge becomes inscribed on the snow surface through the act of traveling, or by sharing the experience of earlier trips. Breaking or following trails is a process of engagement with the surroundings, which implies recognition of snow patterns, landmarks, icemarks, and other navigational aids.

In the past, the knowledge of routes was exclusively transmitted by oral means or gained through the experience of the journey. Although maps and GPS units are being used today, the account of trips, often recounted on the local radio, is still as important as it was before. The knowledge of sea-ice and land routes and the significance of traveling give an indication of the nature of the way Inuit in Igloolik understand and relate to their environment.

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Chapter 5:

Inuit orienting: Traveling along familiar horizons[18]

Introduction

How Inuit are able to live and travel in such an environment as the Arctic has fascinated outsiders from the first encounters, as they were narrated by European explorers. The Arctic itself has exercised an endless fascination, and stimulated people's imagination (Simpson-Housley 1996). I was not an exception, to the extent that I made Inuit traveling the topic of my doctoral dissertation and chose Igloolik as a geographic focus mainly because the island and its surroundings presented low topographic features that made wayfinding a particularly demanding task.

That the Inuit are able to orient across large masses of tundra, sea ice, and open sea, through apparently indistinguishable and seemingly monotonous landscapes, and quickly changing seascapes, without the use of maps or orienting devices known to European navigation, puzzles the external observer. In November of 2000 I was traveling with a hunter while he searched and found seven fox traps hidden under a thick layer of snow that his uncle had set across twenty square kilometres of what seemed to me a flat and indistinctive territory. The traps had been set 25 years before and he (the hunter I traveled with) had not seen them since then. Yet, he was able to find each of them in about two hours of searching. Questions arise: How is it that precise locations can be identified, remembered, and communicated without the use of maps? How does a hunter manage to find and keep his bearings in such an environment as the Arctic?

This paper adds to previous studies and builds from my own experience of traveling with Inuit hunters, as well as from observations, interviews, and informal conversations carried out in Igloolik. It also discusses some theoretical problems regarding space and

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[18] A version of this chapter has been submitted for publication to *Transactions of the Royal Geographic Society*.

orientation, and attempts a comprehensive explanation of the Inuit approach to wayfinding. Finally, it poses the question of what it really means for Inuit hunters to know where they are.

The environment of the Inuit in Igloolik is dynamic, and involves such features as moving sea ice, drastic contrasts between seasons, animal migrations, and the mobility of people. This paper argues that to understand such environment and people's place in it, Inuit use different frames of orientation. The most important of these are the winds and certain spatial referents such as shores, the mainland, the open water and the floe-edge. Journeys and places are frequently described as vistas, and knowledge of the horizon (of how landmarks look at a distance) is essential to travel and to describe the territory successfully. Within these large frames of reference, landmarks, icemarks and seamarks are not memorized as isolated entities but remembered in terms of relationships. Traveling and orienting are not considered by Inuit to be activities or bodies of knowledge liable to be taught and learned as sums of techniques. On the contrary, both traveling and orienting are parts of the broader task of dwelling, which implies a comprehensive engagement with the environment. This engagement is not only accomplished through knowledge of the territory but also through a relationship with the environment that includes emotional attachment and memories of significant places.

The problem of spatial orientation from a theoretical perspective

It is not always easy to talk about how we understand the physical world around us, and how we make spatial decisions. Couclelis thinks that "the difficulty to define space is indicative of the fact that unlike most concepts developed to refer to some specific thing or property of the real world, space is part of the definition of that world" (1992: 215). Downs and Stea showed that the need to know about the world around us is a fundamental human need (1977: 4), and stated that "we are so adept at using this ability to know the world around us that we rarely notice its existence" (ibid: 6). Orienting is, in fact, an activity that we rarely rationalize. From the moment we are born we behave in spatial contexts. Whenever we move, we orient. We continuously face (and solve) spatial

problems without even noticing that we are performing some specific task. Levinson thinks that spatial conceptualization is central to human cognition, and states that "spatial understanding is perhaps the first great intellectual task facing the child, a task which human mobility makes mandatory" (1996: 179).

All cultures have developed and are aware of different methods of orienting, but questions about how humans in general and cultural groups in particular approach space remain far from having definite answers. Attempts to answer such questions have been made from the fields of psychology, linguistics, philosophy, geography, and anthropology, and although they differ greatly in their solutions, most of them agree on one basic point: the answer to that question is a complex one. Easy explanations proposing the existence of a sort of intuition or sixth sense in indigenous populations (Porteus 1931) have long been abandoned at a theoretical level, but still persist in the popular imagination. The same can be said of theories explaining spatial behaviour as a mere response to an environmental stimulus (Tylor 1871). But the debate regarding how humans relate to their environments in the daily business of living remains very much alive, and it often lies in the broader analyses of the relationships between culture, nature, and the goals of the individual (Golledge and Stimson 1997). The problem of spatial cognition among indigenous peoples that live in environments perceived as difficult in terms of orientation is understandably positioned at the very basis of that discussion. The three environments which have been the focus of most scientific research and reflection in connection with indigenous peoples are the desert (e.g. Lewis 1976), the south Pacific ocean (e.g. Gladwin 1970, Lewis 1972, Hutchins 1995), and the Arctic (e.g. Nelson 1969, Carpenter 1973, MacDonald 1998). Those three environments all present challenging spatial contexts for orientation, and the way their native populations have chosen to solve those problems have puzzled western understandings of space, which have been based for a very long time on instrumental navigation and on bird's eye-view representations of the territory.

Environmental psychology proposed an appealing answer to the question of spatial orientation, postulating that people generate "cognitive maps" of their territories (Tolman

1948). A cognitive map has been defined as "a person's organized representation of some part of the spatial environment. It reflects the world as some person believes it to be" (Downs and Stea 1977: 6). According to Downs and Stea "cognitive mapping is a process composed of a series of psychological transformations by which an individual acquires, codes, stores, recalls and decodes information about the relative locations and attributes of phenomena in his everyday spatial environment" (1973: 9). The idea of spatial cognition as a mental representation of the real world has been applied by several authors analyzing indigenous spatial cognition[19]. The idea of a mental grid framing or organizing the world around us has been debated and rejected in different fields. In a study of spatial orientation among the aboriginal peoples of central Australia, Lewis used the concept of mental map, but indicated that this was "continually updated in terms of the time, distance and bearing, and more radically realigned at each change of direction" (1976: 262). Cornell and Heth (1999) showed how route learning and wayfinding take place within an interactive process with the environment. Widlok stated that "the experience of moving through the bush has a role to play in solving orientation problems, even those of a rather non-practical nature" (1997: 320). Finally, Ingold rejected the concept of a cognitive map altogether, indicating that the information we obtain in the environment "is not in the mind but in the world, and its significance lies in the relations context of the hunter's engagement with the constituents of that world" (2000: 55).

Ingold provides a comprehensive analysis of the debate around space and proposes that wayfinding should be understood as a way of dwelling in the world, and that the answer to the question 'Where am I?' lies more in "situating [one's] position within the matrix of movement constitutive of a region" (2000: 235) rather than in the definition of a precise location (as postulated by Hutchins 1995: 52). A region, in Ingold's terms, is the relationships among places, which "exist not in space but as nodes in a matrix of movements", and "wayfinding is a matter of moving from one place to another in a region" (2000: 219). Knowledge of the environment, according to this approach, is not

[19] Gagné wrote about the "cognitive maps" used by Inuit to represent their environment (1968: 38). Both Simeon (1983) and Nelson (1969) used the concept of mental map to analyze the Inuit approach to space. See also Hutchins's (1995) concept of "representational assumptions".

really stored in the mind, and susceptible to be transmitted as if it were a definite body of knowledge. Learning means unveiling, and the education of the novice takes place as a process of revelation, of showing, of fine-tuning of the senses. "What each generation contributes to the next, in this process, is an education of attention" (Ingold 2000: 21-22), a form of perceptual learning that was first labelled by Eleanor Gibson (1969: 155-160)[20].

This approach is implicitly or explicitly shared by most people in Igloolik, for whom learning takes place out on the land in a process of interaction with the environment. Furthermore, it breaks through theoretical assumptions such as the idea of a mental map, and the ones implicit in such English terms as "navigation[21], a concept in itself absent in the Inuktitut language. The tasks of traveling and of orienting are not separated from the daily business of living. A good hunter is always a good wayfinder because both hunting and wayfinding require a comprehensive engagement with the environment. Understanding animal behaviour is not separated from understanding winds or snow formations.

The process of education of attention takes place not in solitude but within a social and historic context, and knowing the landscape becomes a way of belonging to a particular community. This process through which places become *remembered* places, has been fruitfully labelled as people's *memoryscapes* (Nuttall 1992:38-58).

Previous studies and methodology

Inuit geographic knowledge and their ability as wayfinders have been a focus of attention for Europeans since the first encounters. The British expedition led by Captain Parry, for instance, navigated Northern Foxe Basin with sketches of the shores drawn by Inuit (Lyon 1823, Parry 1824). Explorers and early ethnographers produced valuable material

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[20] E. Gibson has a pertinent analysis of how language and sociocultural conventions of naming help novices see important features of their environment. The idea is that labeling can identify attributes that serve to differentiate an object from similar objects or environmental events.

[21] Defined by Hutchins (1995: 12) as a collection of techniques to answer questions such as 'Where am I?'

regarding the way Inuit moved about in their environment (see also Hall 1864, Boas 1888, Stefansson 1913, Mathiassen 1928, Rasmussen 1929, Rowley 1996, among others). The Inuit knowledge of the territory has also been the focus of numerous studies, including topics such as Inuit cartography (Spink and Moodie 1972, Rundstrom 1990), conflicts between Inuit and European approaches to representing the territory (Bravo 1996), survival techniques (Nelson 1969), language and environment (Gagné 1968, Fortescue 1988), perception (Carpenter 1973), and toponymy (Müller-Wille 1987, Collignon 1996) . Some authors have approached the topic from the more comprehensive perspective of Inuit navigation (Nelson 1969, Simeon 1983, MacDonald 1998).

The most important sources regarding how Inuit understand and move in their environments continue to be the Inuit themselves. Regardless of the current use of maps and new transportation and navigational technologies, there are numerous hunters that know and go by methods that have been used in Igloolik throughout many generations.

This paper is based mainly on observation and active participation in traveling that I undertook during four visits to Igloolik between 1998 and 2002. Most of the travel was done by snowmobile between November 2000 and March 2001, and by boat in the summers of 1998 and 2002, with the main purposes of hunting and fishing. I always traveled with experienced hunters, frequently accompanied by boys in their early or mid teens. My main travel companion was Maurice Arnatsiaq, a hunter in his mid-fifties. Travel took place in the most variable weather conditions: across sea ice, flat tundra and mountainous landscapes, during clear days where landmarks were perfectly visible and during blizzards in the darkness of December. The only traveling situation that I did not experience was fog, which in Igloolik presents one of the most challenging conditions of wayfinding. Figure 5-1 shows the area traveled during this study and situates maps and photographs used in the following sections.

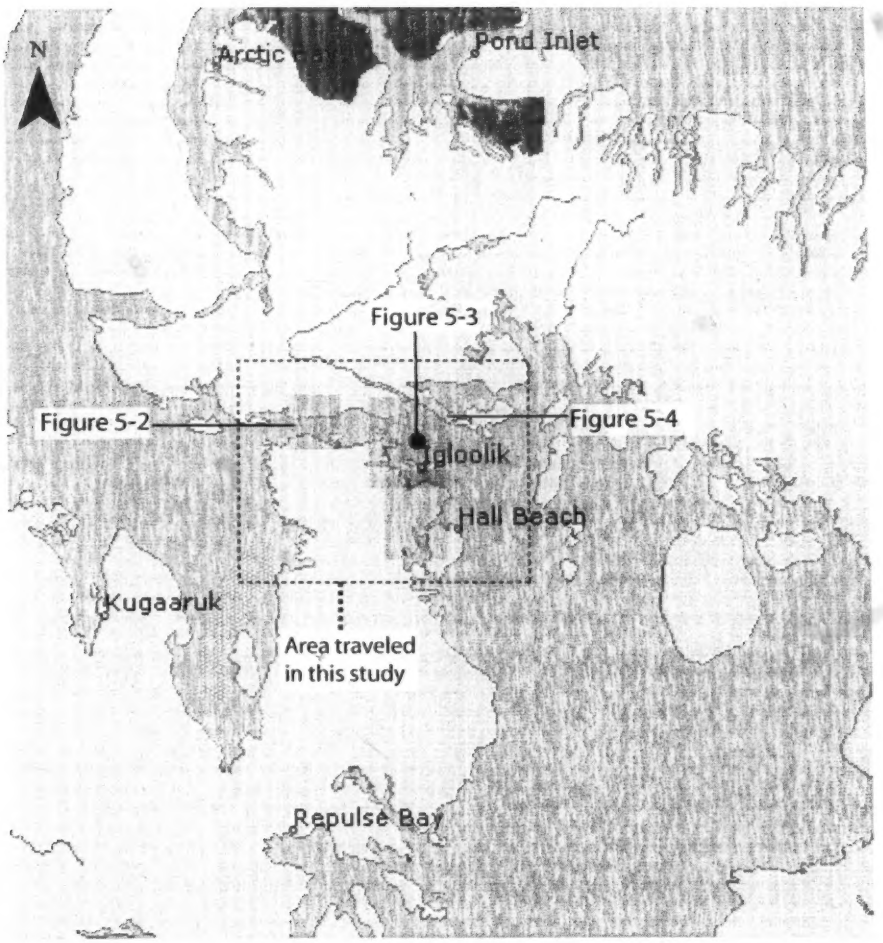

Figure 5-1: Area of travel covered in this study, and location of maps and photographs used in the following sections

All the interviews cited in this paper are part of the Igloolik Oral History Project, and can be consulted at the Igloolik Research Centre. Some of the most valuable sources were self-recorded monologues of elders who were asked to speak of a topic of their choice, and taped conversations between two hunters. Those recordings provided information on how people remember and speak about familiar landscapes, and on how concepts of space and wayfinding are used in regular conversation.

During this study I made intensive use of technologies for mapping and spatial analysis. The combined use of Global Positioning System (GPS), GPS mapping software, and Geographic Information System, proved invaluable devices to analyse movement and spatial decisions while traveling, map place names and trails, and represent the geographic data in a number of different ways, including oblique views that differ from the classic bird's eye-view of regular topographic maps.

A brief description of Igloolik geographic situation

Igloolik is an island approximately 18 by 9 km in size, situated in northern Foxe Basin between Baffin Island and Melville Peninsula, in the Canadian Eastern Arctic. Northern Foxe Basin and the island of Igloolik itself have been a center of Inuit and pre-Inuit cultures for over 4000 years, according to archaeological evidence (Maxwell 1984). According to Crowe, during this long historical period "there has been a striking continuity in the cultural landscape, cultural history and cultural ecology of the region" (Crowe 1969: ix). Igloolik is situated in a biologically productive region, where cases of starvation and infanticide related to scarcity of food have been rare (Mary-Rousselière 1984: 436). The combined action of winds, the topographies of the shore and bottom of the sea, and marine currents create several polynyas in Fury and Hecla Strait (known in Igloolik as Ikiq), including the productive polynya southeast of the island, rich in marine mammals, especially walrus and seals. Beluga, walrus and seals are hunted in the summer and early fall, and caribou and polar bears are found throughout the year in different locations on Melville Peninsula and Baffin Island.

The patterns of travel and land use have changed throughout different historic periods. In the early 1820s Parry pointed out that the most knowledgeable people of the Igloolik area were familiar with a territory of a "a distance of more than five hundred miles reckoned in a direct line [south-north], besides the numerous turnings and windings of the coast along which they are accustomed to travel" (1969: 513). By the time members of Rasmussen's Fifth Thule expedition visited Igloolik in the 1920s, the patterns of travel included regular long journeys to the distant trading posts of Repulse Bay, Pond Inlet,

and Arctic Bay (this last one established in the 1930s). The patterns of travel changed quite dramatically with sedentarization in the early 1960s and with the introduction of motor boats and snowmobiles. Part-time and full-time jobs, and formal education created new contexts for traveling, which is now frequently undertaken as a weekend activity. Despite all the changes[22], traveling is still a very important part of people's lives, and it takes place along routes that have been used for generations by Inuit and that belong to the memoryscape of Inuit of Igloolik (Aporta 2002a). Hunting and fishing are the main reasons for travel, but trips to visit relatives in the communities of Arctic Bay, Pond Inlet, Repulse Bay, Clyde River, and Hall Beach are undertaken on a regular basis, spring being the preferred season for long journeys. Hunting involves trips whose lengths range from a few hours (e.g. hunting on the floe edge) to several days (e.g. searching for caribou or polar bears).

The landscape the Inuit of Igloolik live in

The territory the Inuit of Igloolik travel is quite diverse. It includes deep valleys and fiords on Baffin Island and Northern Melville Peninsula, large extensions of flat tundra in the mainland across from Igloolik, and the crossing of long straits of frozen sea in northern Foxe Basin.

The following three sections describe some aspects of how Inuit in Igloolik perceive their environment, focusing mostly on the perspective of travelers. These sections, the mainland, the sea and the coast, do not correspond with an Inuit categorization, but each of these three features is recognized as distinctive, and each of them plays a significant role in the configuration of a framework of spatial reference.

If language is a way of dwelling (Basso 1988), then naming is a way of experiencing the environment. This is particularly true with Inuit cultures, where place names have an enormous importance (Carpenter 1973, Arima 1976, Correll 1976). Each section below

[22] For a detailed description of social and demographic changes in contemporary Igloolik, see Rasing 1994.

includes a brief reference to place names associated with coastal, land and marine features. Naming often reflects a distinctive approach to the environment as names bring attention to what people consider significant. The place names cited in this paper are part of a database I built in Igloolik from different sources (Aporta 2003). Terms used to refer to larger areas are also discussed.

The mainland

Inuit in Igloolik are familiar with open space that is usually characterized by far away horizons. Flat and mountainous landscapes and seascapes are traversed by numerous routes that have been used for generations, are recreated year after year on trackless snow, and belong to the memoryscapes of the Inuit of Igloolik. Spink's and Moodie's conclusion that, judging from the maps they drew for explorers, coastal Inuit knew little of the inland seems overly simplistic. The authors argue that "the coastal Eskimo uses his rivers as reference points for aiding movement in coastal waters" (1972: 15). Carpenter also points out that an old Igloolik hunter who was asked to draw a map "mentioned no names for most of the islands, though he did for salient points on their coastlines. In other words, he had no interest in land mass, only in geographical points" (1973: 18). Inuit in Igloolik, however, have always practiced inland hunting and fishing, and some of the most important routes to distant places go through chains of lakes and rivers across large extensions of land (MacDonald 1998: 162, Aporta 2002a, see also Boas 1888: 450).

What counts as mainland? The mainland in Igloolik is known as *iluiliq*, which can be defined as "a mass body of land without any islands" (Aqiaruq 1993a). *Iluiliq* is applied to the mainland of Melville Peninsula, but elders in Igloolik remember that in the past the term *iluiliq* was also used when referring to Baffin Island, which was also considered to be mainland. Aqiaruq said that "if it was in the past [Baffin Island] definitely would be *iluiliq*, but now we tend to term it as *Qikiqtaaluk* ["big island"] … this island is so huge [that] we used to refer to it as *iluiliq* because we did not know any better" (1993a). Igloolik was, therefore, located in the strait known as Ikiq between two large landmasses each known as *iluiliq*.

The definition of what distinguishes an island from a mainland is, of course, a matter of scale and perception. The Webster's Dictionary defines *island* as "a land mass, esp. one smaller than a continent, completely surrounded by water," and a *continent* as "one of the principal land masses of the world." For the Inuit, for which space is mostly considered in terms of what is seen (or unseen) in the horizon (see section below), the criterion seemed to have been that a mainland is a large mass of land where the shores are not visible from the interior. The interior of the mainland is known as *nunavik*, which was formerly defined as "a place where the shore cannot be seen" (Kupaaq 1993). An *iluiliq*, therefore, contains a *nunavik*. Both Melville Peninsula and Baffin Island possess a *nunavik*, and they are, therefore, mainland.

Although Baffin Island is no longer considered to be a mainland, terms still used today in the community referring to travellers going back and forth between northern Baffin Island (known in Igloolik as *tappakkua*) and Igloolik imply the consideration of Baffin Island as mainland. *Itijjaaq* ("gone overland"), for instance, is a term that refers to a traveler who has left Igloolik and is on his or her way to the Arctic Bay and Pond Inlet region (Amarualik 1994). Terms that refer to large, distant territories on the mainland are also used. The term *kiva*, for instance, means "where there appears to be nothing" and among the Inuit of Igloolik indicates the southern part of Melville Peninsula (the Keewatin area). This word is the root of words like *kivavvaat*, referring to travellers going to that region[23]. South of *kiva* there is *taungna*, which was known as "the land of the white man" (Kupaaq 1993).

Place names in Igloolik refer to a large variety of features. Of 400 place names collected in Igloolik, over 35 per cent refer to land features, including lakes, rivers, hills, rocks, river bends, rock cairns, and portages. The size or scale of the named features vary from large lakes, such as Tasiujaq (Hall Lake), to such specific features as individual rocks (Iksivautaujaq). Names referring to different parts of the same geographic feature are also common. For instance, there is a river named Ajagutalik that has a bend named Sanguraq.

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[23] Fortescue has suggested that the word Keewatin can be an anglicized form of kivallin (southerners) from the directional stem kivat, which in turn refers to the spatial organization of the igloo (1988: 10).

There is a precise turning point in the river bend named Avalagiavvik. It is likely that such nesting of descriptions reflects a universal method to organize spatial memories (Kitchin & Blades, 2002).

The sea

Virtually all environments the Inuit of Igloolik live in are highly dynamic. Raised beaches are a common feature around Igloolik, and old campsites situated far from the coast are permanent reminders of where the water once was. Some old place names also remind people of the dynamics of the land. Qikiqtaarjuk, for instance, is a peninsula on the Island of Igloolik, but the name means "little island," referring to a time when Qikiqtaarjuk was separated by the sea from Igloolik island proper. The land also changes its appearance on a yearly basis and routes are modified in relation to the snow coverage and the freezing of lakes and rivers.

The sea, however, remains the most dynamic of all environments. Inuit hunters understand the codes of such a changing place, and have discovered its predictability, to the extent that they can exploit the moving ice on a regular basis and make the landfast ice their home for part of the spring. Places like Agiuppiniq (an ice ridge), Naggutialuk (an ice lead), Ivuniraarjuruluk (an ice build-up), and Aukkarnaarjuk (a polynya) recur every year at the same locations, and are identified with names in a similar way as places on the land. I was able to identify 110 terms among the many expressions that hunters use to describe sea-ice topography (Aporta 2002b). The open sea also has a topography that can be recognized and, in some cases, geographically situated. I also identified 15 terms describing the topography of water (Kupaaq 1990, Qunnun 2002), each of them of remarkable technical precision.

Within the environment limited by the sea, there are islands. Islands are not merely positioned but understood in relation to their role in modifying currents and in creating the topography of the sea ice. Michel Kupaaq, for instance, (1987) explained that Simialuk ("the big plug") prevents the currents of Ikiq from flowing freely from the west, and creates the conditions for the existence of three adjacent polynyas. The geologic

characteristics of each island are well known to the knowledgeable hunter. Each island is recognized as having particular kinds of stones or gravel of different colours and shapes (Kupaaq 1987).

Twenty-three percent of the place names collected in Igloolik refer to sea features, including islands, ice features, polynyas, and submarine features. The naming of islands does not follow a unique criterion. The island of Igloolik was only named as such by Parry's second expedition in search of the Northwest Passage. For the Inuit, the name Iglulik refers to a camp southeast of the island. There are nineteen named features on the island, but the island itself has no Inuktitut name. Some other islands, however, are named as a whole (e.g. Saglarjuk). There are also names for clusters of small islands (e.g. Uqsuriattiangujaak, referring to three adjacent islands, or Uglit referring to two islands).

Within the sea-ice environment, the floe-edge plays an important role in Igloolik, both for its productivity and as a frame of spatial reference. Within the frozen sea, the microenvironments constituted by polynyas are significant in defining the territory. Several features are recognized in that environment of which the most important are the landfast ice (*tuvaq*), the moving ice (*aulajuq*), the open water (*aukkaniq*) and the floe-edge (*sinaaq*).

Ice cracks and leads are identified depending on whether they run parallel or perpendicular to the floe-edge. Although the floe-edge moves, it is always spatially situated in one specific area which is visible in the horizon as a dark blue reflection of the water on the sky, a phenomenon known in Igloolik as *tunguniq* (MacDonald 1998: 184). *Tunguniq* is sometimes strikingly visible as a thick line above the horizon, and sometimes as a distant dark point. It becomes an important spatial reference when traveling across the flat tundra on the neighbouring mainland.

Travel over open water and ice are sometimes recognized with different terminology even when the terms refer to the same spatial action of going towards or away from the shore. *Kangivaq* and *tuvviaqttuq* refer both to a return journey from the sea, but the

former term is used when boating in the open water and the latter when coming back from walrus hunting in the moving ice. *Sammuk* and *mauttut* are terms that refer to the same spatial action of going out, the former referring to leaving the beach for the open water and the latter to leaving the landfast ice or the beach for the moving ice.

The coast

Inuit in Igloolik interact with the marine environment all year round, and most camps (present and past) are situated on the beach. The shores are also portages between land and ice routes, and they help determine good anchoring places and shallow areas. Rising beaches, deep cliffs, long fiords, broad bays and low shores are all significant features for the traveler.

The coast plays a significant role as a framework of spatial orientation, as it does in other cultures whose livelihoods are tied to the sea (Cablitz 2002). Fortescue noted that terms indicating *away from* and *down to* the shore, and *left/right-along-shore* are an important part of coastal Inuit orientation systems (1988: 25). The importance of the littoral is evident in many stories told by Inuit elders in which the action frequently takes place in reference to the shore (see for instance Siakuluk 1996). It is also manifested in the terminology used to describe the shore and people's relative position to the shore. Noah Piugattuk remembers how, in the summer, people would split between those going caribou hunting inland, and those staying in the littoral. "There was a time when certain individuals would be planning a trip for the inland for the summer… those that stayed on the littoral would hunt marine animals to store them for the winter. Those that stayed on the littoral would be in a place that was identified by the name of the land" (Piugattuk 1989). In Igloolik, the term *ataartut* is used to refer to people going down to the littoral from the interior (Aqiaruq 1993b). People who remain on the coast while others went inland are known as *Singmiujuq*.

Numerous features are defined in reference to their position relative to the shore. The terms *tilliq* (higher) and *salliarusiq* (the one further down), for instance, are sometimes used to refer to the relative position of mountainous ranges in reference to the shore (as

seen from the sea) (Kupaaq 1993). Shore cracks (*qungiit*) are important, as they help to observe the tidal movement and tidal shifts. They are also named in relation to their relative position to the shore (here the observer is situated on the shore): *tilliqpaaq* ("the one that is higher than the rest") refers to the first shore crack, *akulliq* is the one in the middle and *salliq* the one further away (Imaruittuq 1990).

Almost forty-two per cent of the place names collected for Igloolik refer to coastal features. As with the names of land and sea features, place names related to shores designate features of different scale. Many of them refer to points, but others refer to long stretches of shore. Names defining specific points within larger named features have frequently the same linguistic root as the name of the larger feature. Iqaluit Nuvua ("the point of Iqaluit"), for instance, refers to a point within the bay of Iqaluit. Other names refer to fiords, cliffs, landing points, places from where one can have a good look at the surroundings, places ~~that~~ are shallow, places that are deep, and campsites.

As can be inferred from the place names cited above, naming of the shore is not only related to residence but also to traveling. Both land and ice trails are fairly stable from year to year and they begin or terminate at specific coastal places for landing and launching. While traveling across straits of open water or sea ice, named places are marks on familiar horizons. As I will show below, the named horizon constitutes an important spatial framework for the traveler, in that names referring to larger- and smaller-scale features help define where one is.

How Inuit move and find their way about

Intimate knowledge of the land, the shores and the sea is not enough to make someone a confident wayfinder. Someone who feels at ease while undertaking long journeys, hunting, and talking about such large territory, must know how to answer such questions as Where am I? (or where a place is), and How do I get there?

Ingold defines wayfinding "as a skilled performance in which the traveler, whose powers of perception and action have been fine-tuned through previous experience, 'feels his way' towards his goal, continually adjusting his movements in response to an ongoing perceptual monitoring of his surroundings (2000: 220). Traveling does not take place through abstract space but between places. Places, in turn, are nodes within a network of coming and going which Casey defines as a "region" (Casey 1996: 24, cited by Ingold). A region in Igloolik is constituted by the territory a person is familiar with either through his or her own travels or through somebody else's narratives.

Inuit in Igloolik organize such regions and places within different frameworks of spatial orientation. There is enormous variation with regard to how people from different cultural groups construct and use these frameworks. Micronesian navigators use East as a cardinal direction and use "moving islands" to monitor traveled distance (Hutchins 1995: 183). Ulysses is said to have used the winds and stars to navigate (Homer 800 BC: 24, 60), as did Marco Polo (1228: 26,93), and the Argentinean gauchos guided themselves in the pampas by the use of stars, the sun, the winds and the behaviour of animals (Hernández 1872: 132). A wind-rose composed of sixteen wind bearings is said to have oriented European sailors from classical times through the Middle Ages (Aczel 2001: 36).

Hutchins referred to these ways of organizing or looking at space as "representational assumptions" and stated that beyond these representations all cultures answer to essential questions such as 'Where am I?' in fundamentally the same way: by fixing a position through a combination of one-dimensional constraints (1995: 50-52). The spatial frameworks used by Inuit in Igloolik are better described as ways of experiencing the territory rather than of representing space. Having a spatial framework is not seen here as imposing an abstract grid onto the world, but as a way of experiencing or perceiving the environment through the engaging process of moving (literally or figuratively) in it. These frameworks are shared by the members of the community, and have been developed through generations. A memoryscape can exist at a social level only because people within a community share ways of experiencing the landscape they live in. That is

why people from a particular culture can understand each other and why people from different cultures can misunderstand each other (Bravo 1996).

Despite the interest that Inuit wayfinding ability has aroused in the past, systematic studies regarding what constitutes Inuit spatial frameworks are rare. Fortescue's analysis of orientation terms from Siberia to Greenland brought to light the existence of a pan-arctic system of perceiving space, with regional variations and similarities. Fortescue identified two major frameworks of orientation: the one constituted by the prevailing winds, and the one determined by the shore (for inland Inuit groups, rivers take the place of the shore) (1988: 25). MacDonald's study of Inuit Astronomy describes the role of the sky in Inuit spatial orientation, and provides also a detailed description on how Inuit of Igloolik use winds and snowdrifts in navigation (1998: 173-182). Other authors (Carpenter 1973, Nelson 1969, Simeon 1983) have approached this issue marginally.

MacDonald rightly points out that there is no one single method of Inuit spatial orientation and that hunters and families differ in the knowledge they possess and in how they learned it (1998: 6). Hunters in Igloolik give different answers when asked which methods they prefer for orienting and wayfinding. Stars, animal behaviour, the sun, landmarks, seaweed, the moon, and snowdrifts are nearly always mentioned but while some people, for instance, have a thorough knowledge of stars' trajectories and constellations, others simply use some stars to keep occasional bearings while traveling. All wayfinding methods, however, are used and understood in relation to a limited number of shared frameworks of spatial orientation known to everyone in Igloolik. These frameworks are constituted by the direction of prevailing winds and by the position of the mainland, the shores and the floe-edge. All methods are understood in relation to such frameworks: animals and seaweed move in reference to the shore or the floe-edge; sky features are situated in reference to wind bearings; and people move in and see the territory in terms of horizons where winds, shores, mainland, sea, floe-edge, celestial marks and familiar landmarks are situated, described and experienced. The most significant element in terms of how Inuit experience the environment around them is constituted by the winds.

The winds

Winds occupy a central place in the lives of the Inuit of Igloolik. The winds foretell weather changes, shape patterns on the snow, and regulate (along with the tides) the behaviour of the moving ice. They are by far the most discussed of all environmental phenomena (MacDonald 1998: 182), they largely regulate hunting activities, and they play a fundamental role in spatial orientation. Education regarding the learning about winds starts at a very early age. Inuit who were born on the land remember when they were told to *anijaaq* ("go out and report on the wind and sky conditions" (Amarualik 1994)). The winds, or the anticipation of a shift, are "read" in cloud formations, weather patterns in distant regions, sea waves, and in the behaviour of marine mammals, which face the direction of the wind even before it starts to blow.

Contrary to Carpenter's opinion (1973: 22) Igloolik hunters point out that navigating by the winds can be deceiving, and that subtle changes are sometimes difficult to notice. For someone who is navigating by the winds, a gradual shift can bring about a dangerous situation, resulting in the loss of his spatial framework. Wind shifts are even more difficult to notice today due to the use of new means of transportation. Amarualik points out that "since we have the fast machines that we use now it always seems like we are traveling against the wind even if we are not" (1994) .

The winds, therefore, are mainly considered in relation with their shaping of the snow. The snowdrifts (technically "sastrugi") left by the prevailing winds are the most reliable source of spatial orientation for the attentive observer. There are various snowdrifts of different shapes and sizes, but only the drifts left by prevailing winds can last throughout the winter. Experienced travelers can thus read the substantial spatial information left by the winds in the snow[24]. The Inuit of Igloolik recognize four primary winds: Uangnaq

[24] Ikummaq warns that local topographic features may affect the general directions of drifts. Side hills, for instance, may produce downdrafts that differ from directional patterns of snowdrifts shaped by winds (2000).

(WNW), Kanangnaq (NNE), Nigiq (ESE) and Akinnaq (SSW) (MacDonald, 1998: 181). Uangnaq and Nigiq are the two prevailing winds.

Uangnaq produces snowdrifts that range in height from several centimetres to almost one meter. These snowdrifts are named uqalurait (like a tongue), and are easy to recognize as their shape is distinctive and they become harder and permanent features on the snowscape. The tips of the uqalurait always point towards WNW, providing a reassuring orienting aid. Nigiq, on the other hand, is a constant wind blowing from ESE, which smoothes the ground over and produces snowdrifts known as uluangnaq (like a cheek)[25].

Hunters usually use uqalurait to set their bearings while traveling across large extensions of flat tundra, or during periods of poor visibility due to weather conditions or darkness. When snowdrifts are not visible they can be felt as snowmobile or dog-team drivers set a course that involves cutting across the drifts at particular angles. Hunters are able to indicate the location of different named places beyond the horizon just by identifying their current position in relation to a landmark and by using the snowdrifts as reference for direction.

Along with the uqalurait and the uluangnaq, there are other snow formations that provide spatial information to an attentive hunter, including *qimukjuit* (drifts formed on the lee side of rocks), *sivingajuq* (snow build up on the lee side of a hill), *tissujaaq* (snow build up on the lee side of an ice floe, usually by a Nigiq wind), and *tullimajuq* (snow surface which has been smoothed over by a Kanangnaq wind and has been compacted by human or animal tracks.

Wind bearings: Winds are not merely winds. They constitute an abstract (but environmentally situated) frame of orientation, a way of placing oneself within the territory and of placing the territory around oneself. As with the Ojibwa (Hallowell 1955:

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[25] MacDonald (1998: 173-181) offered a detailed description of the use of snowdrifts in Igloolik. According to MacDonald (2003, personal communication) several elders are noticing a slight change in the direction of prevailing winds, which may eventually affect the reliability of snowdrifts as directional aids.

191), winds are named from the direction they blow. The Uangnaq direction, for instance, is WNW, which is actually the place from where it blows. But Uangnaq exists beyond its actual blowing at a particular moment. It exists as a cardinal direction. Winds constitute a kind of wind-compass, which is neither completely abstract nor completely concrete (see also MacDonald 1998: 177, 298). It is not completely abstract because it is ultimately connected to the blowing of a prevailing wind and is manifested through a distinctive shaping of the snow. It is not completely concrete because it exists independently of the blowing of the wind. Qunnun explains the functioning and spatial terms derived from this axis:

> The prevailing wind Uangnaq is the determining factor to tell direction. For instance, Uangnaq direction can be visualized as an animate object with its back to the Uangnaq... This wind is transformed to a person facing away from Uangnaq …[left] would be termed as Kanangnaq, [and] the other side is Akinnaq (2002).

The use of the wind compass, as an environmentally-situated orienting device, allows a familiar egocentric frame of reference[26]. The axis is spatially situated around the Uangnaq-Nigiq pair, with Uangnaq as the determining cardinal direction. Uangnaq, as pointed out above, is clearly indicated by the tip of the tongue of the snowdrifts uqalurait. On the island of Igloolik, MacDonald measured the winds with a theodolite as their directions were pointed out by an experienced hunter. He established the bearing of Uangnaq to be 296 degrees as translated to an European compass rose (1998: 181). I determined an identical bearing when measuring the pointed part of the uqalurait with a GPS unit at about 200 km south of Igloolik. Ikummaq said that uqalurait were reliable

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[26] Because of the bilateral symmetry of our bodies, humans find it easy to conceptualize our surroundings with ourselves in the center, facing forward (Howard & Templeton 1966). Cornell (personal communication) states that the forward orientation is specified by the frontal position of our sense systems for guiding locomotion and avoiding obstacles. Our spatial sense systems are symmetrical around a central axis, providing for binocular vision, stereophonic sound, and olfactory localization to the left and right. The wind compass preserves the egocentric framework from the perspective of a traveler looking at the horizon.

directional aids all the way during a trip from Igloolik to northern Greenland and that they keep a similar directional pattern as far south as Repulse Bay (2000).

MacDonald identified "in between" winds, and stated that the vocabulary allows the recognition of up to 16 bearings:

> The term akurruttijuq, used in conjunction with any two adjacent primary names, indicates a "midpoint" wind, hence uangnamillu kanangnamillu akurruttijuk signifies a wind bearing approximately NNW (338°). Winds occurring in the sector between a given cardinal point and the akurruttijuq "midpoint" line take the nearest primary name to which is added the suffix –passik. Thus uangnaqpassik is a wind bearing approximately 317° (NW), while kanangnaqpasik bears almost true north. In this way, variation in wind direction down to gradations of 23° can be readily specified (1998: 181).

Wind bearings are used in descriptions of places and routes. Stories, and even dreams are frequently spatially situated by using wind bearings (see Siakuluk 1996). In self-recorded interviews, when describing hunting or travel episodes that took place a long time ago, the direction from which the wind was blowing is nearly always mentioned (see, for instance, Kappianaq 1990).

In some extreme travel circumstances, the wind becomes the only factor that allows hunters to ascertain and maintain their location and bearings. As long as hunters keep in mind the spatial reference provided by the wind, they do not get lost. At the end of November 2000 I spent several days ice fishing with a knowledgeable hunter and his son on a river not far from the island of Saglarjuk. We were planning to cross a part of the strait that leads to Majuqtulik where we were going to search for caribou. We were among the earliest travelers to Majuqtulik, and the sea ice was just stabilizing. The sea ice was rough and there were no established trails for the crossing, as they varied from day to day due to the pattern of the freeze up. It was dark, and the blowing snow limited

the visibility to the extent of the snowmobile's front light. There were no patterns on the snow, no visible stars, no coastal features in view, and the ice was so rough that we had to turn around several times just to find a passable route. The track recorded by my GPS unit, however, reveals no hesitation regarding the setting of the course, which indicates that the trail breaker was completely aware of the target location at all times.

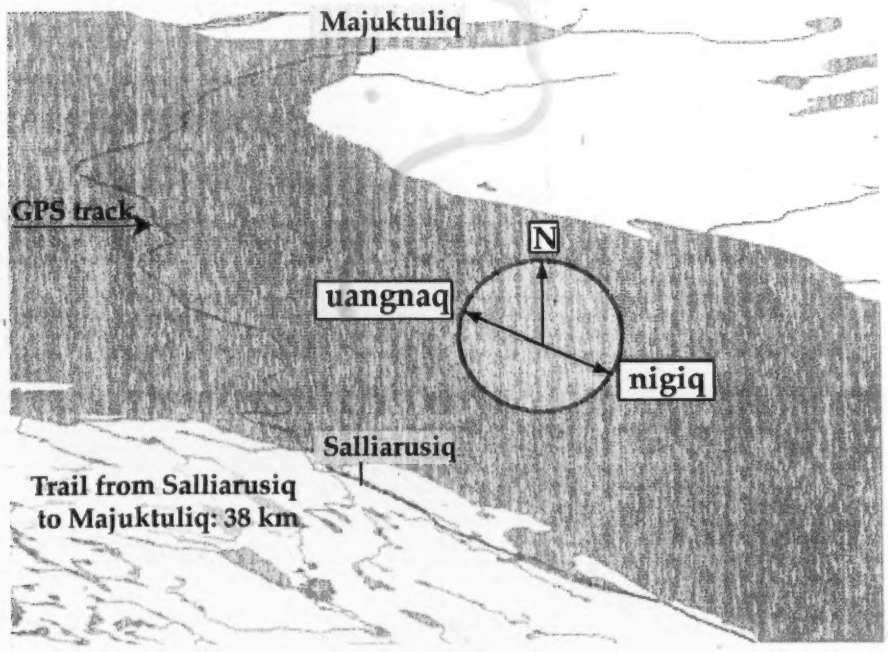

Figure 5-2: GPS track of a trail broken across rough ice during a blizzard

After the trip, I asked the hunter how he managed to keep his bearing in such poor conditions. He answered that the wind itself was an indication of direction, and pointed out that "as long as you know where the winds blow you can know where your are going." Blizzards in Igloolik usually come from either Uangnaq or Nigiq direction[27]. Both Uangnaq and Nigiq have different characteristics that often make them recognizable, and travelers can maintain their sense of direction as long as they identify the direction from which the wind blows.

[27] Winds can blow strongly from other directions, but they do not possess the persistence and intensity of Nigiq and Uangnaq (Kappianaq 1993).

I asked many hunters what was the most challenging situation in terms of wayfinding. None of them mentioned blizzards. On the contrary, they all agreed that the worst situation is fog in calm conditions, where winds cannot be perceived. That is basically the only situation in which even a knowledgeable hunter can seriously lose his bearings. Having lost the spatial framework provided by the winds, the hunter can only regain his bearing by identifying another spatial framework such as the shore or the floe edge, or by recognizing a familiar landmark[28]. In the open water, kelp can be used to determine direction if the tides and currents are kept in mind. Otherwise, this is the kind of situation where knowledgeable hunters simply advise that it is best to stop and wait until it clears up.

The Horizon

People in all cultures are able to move without the use of maps. Maps, however, have become significant for western European approaches to space, resulting in the developments of the science of cartography and of sophisticated mapping and surveying technologies. Long distance voyages are today unthinkable without maps, and one of the obsessions of maritime enterprises through several centuries was that of discovering and mapping *terra incognita*. Two elements are distinctive in a map: the view from above, and the representation of the territory at a certain, uniform scale. When Europeans and Inuit met in Foxe Basin, and the European explorers inquired for information about unmapped places, one of the great difficulties encountered was that of reconciling the European bird's eye-view of the territory, as represented in maps and charts, and the Inuit approach to the territory as viewed from the perspective of the traveler.

European navigators, of course, were not unfamiliar with horizons. Nor was a bird's eye-view of the territory completely foreign to the Inuit[29]. Communication of geographic knowledge was ultimately possible because both parties were able to understand the

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[28] Zachariasie Panikpakuttuk provided an example of losing the wind bearings and regaining a sense of orientation by locating a large mass of floating ice (1992)

[29] Some place names such as Ulunguaq ("it looks like an ulu") and Usuarjuk ("small penis") refer to shapes of the land as pictured from above.

other's approach (a point noted by Parry 1823 and Bravo 1996). Despite this, for most Inuit hunters knowing 'where one is' is related to one's ability to identify familiar horizons or vistas[30]. Topographic features (on the land or on the ice) are spotted from a distance and bearings are determined by orienting such horizons with various spatial frameworks, of which the most important is constituted by an axis of prevailing winds.

The importance of the horizon becomes evident while traveling, to the extent that, in some cases, the horizon is the main means of orientation. Inuit in Igloolik experience the territory in terms of vistas of the horizon even when talking about places that are far away, or about large extensions of land, or while describing a long journey or a route. That is why experienced hunters stress the importance of not focusing only on the trail ahead, but also of looking back and to the sides, to be able to identify a place from a number of different perspectives. Although the slow motion of the dog team was better suited for this practice, hunters traveling by snowmobile still look around while taking tea breaks or when re-fuelling their machines. A common way of teaching younger or inexperienced people during these stops is to ask them to point at different places in the horizon[31].

Narratives of journeys are full of descriptions of vistas (see, for instance, Kappianaq 1990). Amarualik says that in the past these descriptions were so detailed, that "you could almost picture the place where you are going; even if you had not taken the route before you would recognize the places that were instructed to you… nothing was ever written or maps were not used" (1994).

For the experienced traveler, familiar with the surroundings, horizons do not need to be visible (Cornell & Heth 2003). Traveling at night or in poor visibility, a hunter should still picture the surroundings around him. Iqaqsaq stresses the importance of looking at and remembering landmarks: "If you left in search of caribou when it is still clear and

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[30] This, again, is not a unique Inuit approach. See Heft (1996)

[31] Tests such as these are a natural example of prospective memory strategies; similar rehearsals have been experimentally demonstrated to be effective (Heth, Cornell & Flood 2002)

you can see all mountains and the landmarks that you pass, it is important that you memorize these landmarks as you go along. When you get caught in a fog you should be able to tell where you are and get the general direction of your tent" (Iqaqsaq 1993). There are examples of people who became lost because of bad visibility, but who were able to regain orientation by recognizing one single landmark (Kappianaq 1990). George Qulaut remembers that, when he was in his early twenties, he lost his sense of direction on a windy day and drove his snowmobile to the mainland instead of to Igloolik. He started traveling along the coast until he was able to identify one landmark on the shore, "and I knew Igloolik was straight across" (2000).

A correct reading of landmarks on the horizon is critical for making accurate landings in the long crossing of Ikiq between Igloolik and the Baffin Island coast. The crossing of the strait, from Igloolik to Iqaluit Nuvua is approximately 50 km. In good visibility, coastal features of Baffin Island and Melville Peninsula are visible on some parts of the distant horizon. During the crossing, travelers are able to orient themselves and keep their bearings by recognizing named places on the shores. I crossed the strait several times accompanying experienced hunters, traveling both by boat and snowmobile. During one of the crossings, my travel companion helped me identify several landmarks on a very low horizon that had seemed to be quite indistinctive to me. Figure 5-3 is a panoramic view of the horizon during a boat crossing in August 2002. Some named landmarks that my travel companion pointed at have been included.

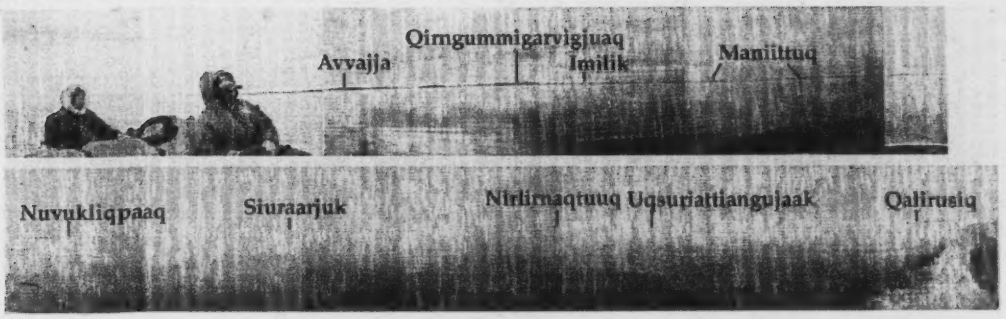

Figure 5-3: Photograph of the horizon during the crossing of Ikiq, and some of the names identified by Arnatsiaq (the photo has been divided into two parts for printing restrictions).

A GPS track of that boat trip (Figure 5-4) shows how the hunter aimed at an island called Nuvukliqpaak. Nuvukliqpaak means "the farthest point of land from the mainland," referring to its relative position in the horizon as seen from Igloolik, as can be appreciated in the photograph of Figure 5-3.

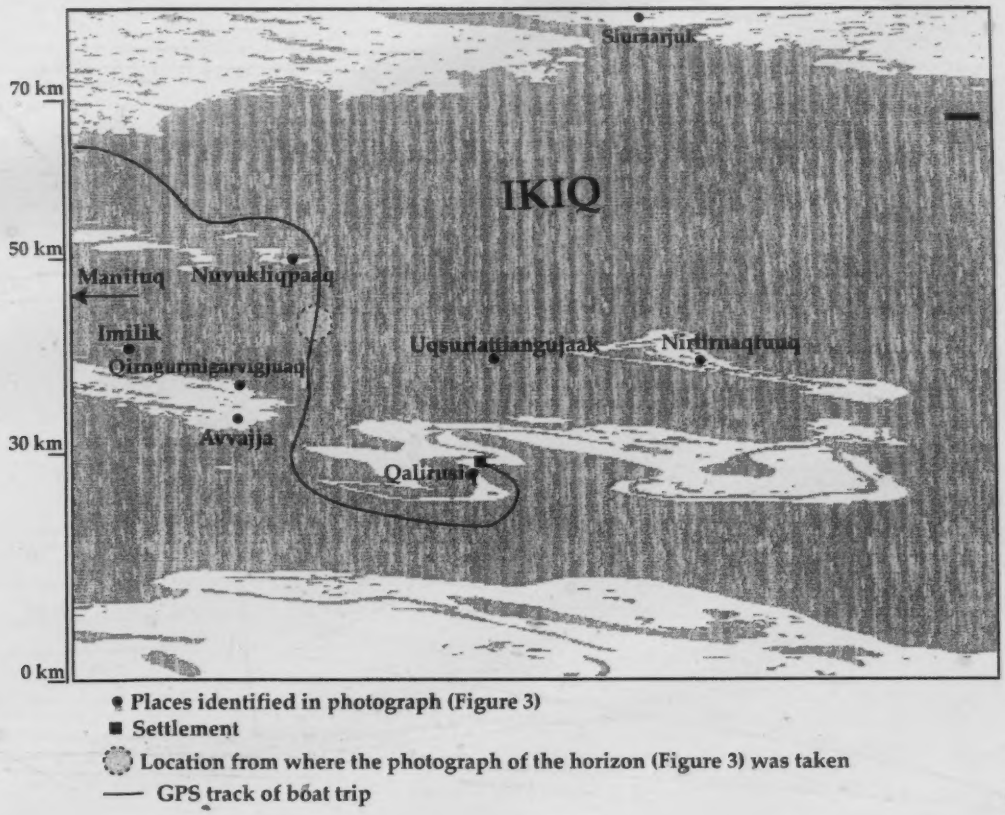

Figure 5-4: GPS track of a boat trip across Ikiq.

Defining and describing precise locations

Oral descriptions of routes for people unfamiliar with a place, or descriptions of a very specific location (e.g. a turning point in a trail, a caribou cache, a fox trap, a broken sled) are frequently given in relation to a landmark appearing on the horizon. Asked to describe what kind of information he would give to another hunter to describe the precise location of an object, Louis Alianakuluk explained:

> If I left something behind at Ikiq…it might be that I left my machine behind, if I was to say that it is somewhere at Ikiq, no one would know

> where it is at. But if I was to say that it is just above the old floe-edge, or if I was to say that it is close to the *nipititaaq* [moving ice that has stuck to and become part of the landfast ice], or just below it, at once someone would identify the location. Then I might say that I left my machine behind, where certain pressure ridges were in view at a certain direction. If I was to give this kind of information, even a person that did not leave the machine behind would now be able to go to the place (2001).

Alianakuluk narrowed down the description of the location in different stages. First he mentioned Ikiq, which defines a relatively large expanse of territory. Then he described some topographic features of the ice that people sharing his memoryscape would identify and locate. To define a more precise location he mentioned that at the specific spot where the object is located there is some landmark visible on the horizon in a certain direction. His hierarchical descriptions of spatial relationships recapitulate what may be, in fact, a fundamental organizational property of human spatial cognition (Kitchin & Blades, 2002).

Within vistas defined by horizons, places and people can be situated, but even familiar horizons need to be oriented in order for them to be meaningful from the point of view of the wayfinder. The relative position of an individual or a place in relation to a landmark on the horizon is defined by the use of wind bearings. Theo Ikummaq remembers that on one occasion he was traveling to Repulse Bay when he got off the established, well-known trail and found himself confused as he tried to locate it again. He used his shortwave radio to communicate with his uncle in Igloolik and ask for advice. Ikummaq explains how his uncle asked him several questions to understand where he was situated:

> *Question: If you are facing down wind, what do you see?*
> *Answer: A couple of hills, a couple of large hills.*
> *Question: Facing toward the wind, what do you see?*
> *Answer: Some rocky outcrops.*

Question: To your left (that means towards Repulse) what do you see? Look to your left, what do you see?.

Answer: I see a narrow rocky outcrop, but it ends, and then it starts again a little further on and then it continues on.

Question: That's the trail to take. You go between that and then you will find the main trail.

And such was the case. He wasn't there. But he could determine where I was from what I described (2000b).

Ikummaq's story illustrates how the territory is seen and remembered as vistas orientated by some spatial framework (in this case wind bearings). Place names help enormously in defining specific geographic locations. If someone has to explain that an object was left in, say, Iksivautaujaq (a boulder located southeast of Igloolik), no major descriptions are required other than the name. The name itself conveys a precise geographic location for those who share the same memoryscape. Some places are identified with names that in themselves inform of their particular location in relation to some spatial framework. Aggu, for instance, is a bay whose name means "facing the prevailing wind," and Alarnaarjuk is a lake whose name means "facing away from the sun".

If an object has been left in an unnamed place, its location is most commonly described by calling up a name or a distinctive landmark that can be spotted on the horizon and identifying the location in reference to that place by using wind directions and an estimation of distance. Alianakuluk stresses the importance of place names and winds in determining a precise location, and implies the historic continuity of such knowledge:

> Inuit always use the name of a location to determine where he is going. Most of the landmarks have their own names, so it is important that these place names are passed on. In our times we knew the names of places … we knew place names from the time of our youth. Places should have names, these names should be well known. We knew the place names, we learned these from our parents… If a hunter had left behind a catch or

> something worth returning for... If I was to be asked to go and get it, if I knew the location of the place name that he mentions, then using the direction of the wind, I am able to retrieve the item to be brought back…He would also mention how far the object is from that place name. With these instructions then I am able to go and retrieve the object. That was the way we used to do it in our youth (2001).

Qunnun compares this approach with a spatial grid provided by maps. He points out that place names are called out and the target locations are defined by the winds. "It is important that place names are visible, as it would help you to go and look for something. It is just like map bearings with all the numbers, this is identical to that" (2001).

A knowledgeable hunter, therefore, can move and talk about the land, using numerous spatial references in an environment that he sees from the perspective of the traveler: as vistas. Furthermore, the dynamics of the environment and the dynamics of animals and people take place within the stability of fixed spatial frameworks provided by the shores and the winds, and within familiar places and regions. A knowledgeable hunter is engaged in such a way with the environment, that what may appear a homogenous landscape to an outsider is in fact full of spatial references. Figure 5-5 shows, in a schematic manner, some of the ways in which the space and movement can be experienced by Inuit in Igloolik.

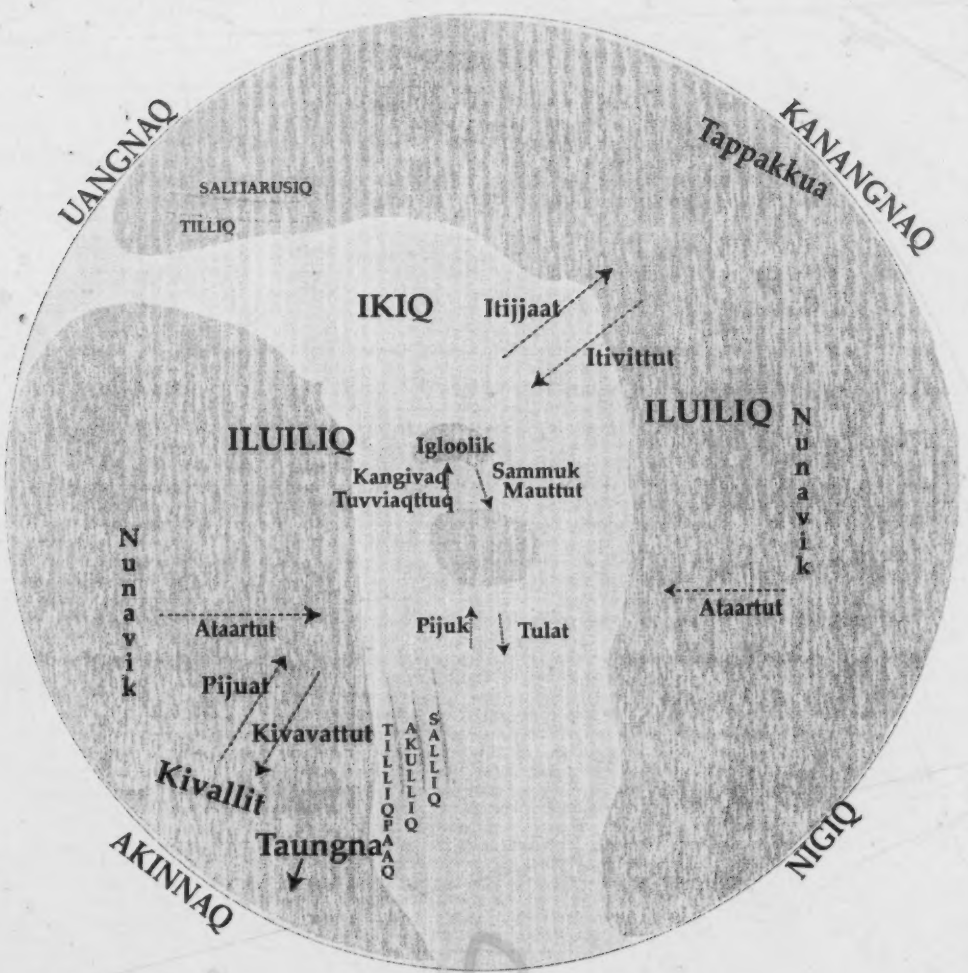

Figure 5-5: Schematic drawing of some directional terms and features

In this environment, everything takes place and makes sense within several frames of spatial reference: fish swim up and down the shore, seals move against or towards the floe-edge, birds fly towards and away from the shore, places are located in reference to the winds, and winds and celestial landmarks are identified with positions on familiar horizons. Descriptions and narratives make sense without the need of drawing or pointing at places on a map. A clear example was provided by Siakuluk while he was telling a story of two people who committed murder. Siakuluk pointed out that after the murder was committed they built an inuksugak (stone cairn) which was shaped like a human

figure. The inuksugak "is facing the direction where the two fled. It is located some distance away from Ualinaaq towards the land away from the littoral" (1996b). Siakuluk situated the story by naming a place (Ualinaaq) and using some spatial referents for direction.

Knowledgeable Igloolik hunters repeatedly say that they have never been lost. They have all faced challenging wayfinding situations and have been uncertain of their location, but they see those situations as temporary losses of orientation. A changing wind, moving ice or bad visibility has confused them, and their response to such a situation is always the same: stop traveling or look for a directional clue until a spatial framework can be regained. A hunter who is knowledgeable of the spatial frameworks described above and who is knowledgeable of the geology of the ground, the patterns of the water and ice, and who is familiar with placenames around him, is traveling through a territory that is so familiar that it feels like home. Confident travelers are simply knowledgeable people who are able to understand the environment as a whole and people's place in it. A good wayfinder in Igloolik is identified with the term aangaittuq, which means "attentive." "Aangaittuq is a person who is real observant and who knows where he or she is at all times" (Qamaniq 2002 and also Qunnun 2002). The opposite of aangaittuq is aangajuq, defined as "one who moves away from the community, and immediately loses where his destination is at, so as a result he will travel blindly" (Qamaniq 2002). Both aangaittuq and aangajuq have extended meanings that go beyond wayfinding (MacDonald, personal communication). They imply an attitude towards the environment and towards life in general. Being a good wayfinder is not different from being a good provider as both hunting and wayfinding are parts of the broader task of dwelling. In a changing context of part time jobs, formal education and life in town, being aangaittuq is perhaps more important now than it ever was before.

Conclusion

Several hunters told me the story of two young people, in their early twenties, who got lost a few years ago somewhere in Northern Melville Peninsula. Elders were all amazed when telling the story at how these two people traveled in the wrong direction for ten

days until a search party found them in a state of near starvation. Their amazement is based on the fact that there is enough information in their environment to prevent them from ever becoming seriously lost. The story, told and retold, is also seen as a warning sign of what is happening today with people who spend most of their lives in town but for whom traveling and hunting are still significant activities.

Undoubtedly, the Inuit experience of their environment goes beyond the understanding of spatial frameworks. People move at ease in an environment that contains considerable spatial information, but also through places and regions that are known and named, through topographies of the ice, the snow, the water and the land that are familiar and that in themselves provide more information about specific locations and general directions. They also move through and live in an environment that is significant from many different points of view beyond that of spatial orientation.

People remember places not as mere locations but in contexts, because places cannot be separated from past experiences, including such emotions as sadness, happiness or love. A respected Igloolik hunter and skilful wayfinder, George Kappianaq, made this clear:

> My memories would return to me to the times we all lived in big families. There are so many things that remind me when I go back to the locations where we used to live; today memories will return to me as if things were there; with the passage of time I no longer feel too much emotion but memories still come back to the time when we were whole. [What] I remember most was the time both of my parents were alive and well. Even the thought of the late wife will come … thinking she too was alive and well. I would imagine others too have fond memories (1990).

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Chapter 6:

Satellite Culture: Global Positioning Systems, Inuit Wayfinding, and the Need for a New Account of Technology

Claudio Aporta and Eric Higgs

> If a young person asks a GPS where a certain place is, that GPS will tell him; tell that young person. But if that young person approaches an elder and asks where that certain place is, that elder is going to go detail by detail, and then describe what is before that, not necessarily where that is. Describe this comes out first, like a bay, a point, an inuksuk [rock cairn], and so on and so forth. As you progress, they'll tell you exactly what to expect. And a youth doesn't have time for that. He wants to know where that place is... There are some people of my age who rely on GPS because their fathers didn't sit down with them or took them out on the land to teach them where to go, how to get there, what's dangerous. They haven't done that. And overtime, if you keep practicing, [Inuit orienteering] is almost like a science. And maybe it is a science, as a matter of fact, but nothing written. It's just mental, it's just knowledge passed on from generation to generation.
>
> Ikummaq, 2000.

Introduction

In a grocery store in Igloolik, one of us, Claudio Aporta, met up with a seventeen-year-old friend who was obviously in distress. His father had asked him to find a broken snowmobile left behind several days earlier and many kilometers from town. The young man had been out all afternoon looking for the machine, which had been covered by the blowing snow typical for that time of year. Igloolik is located on a small island of the

same name. The surrounding sea is covered for much of the year by ice floes, which in the winter freeze together to create a relatively flat but highly variable surface for travel. To the west is the Melville Peninsula and mainland Nunavut (Canada), which is a landscape without dramatic topography.

Figure 6-1: The geographic situation of Igloolik

Difficult by any measure, travelling in this land- and seascape as the Inuit peoples have done for millennia requires a sophisticated knowledge of subtle qualities: coastline shape, stone cairns, snowdrifts, wind direction, currents, animal movements, dreams, and other clues (MacDonald 1998; Aporta 2003). Elders report tough journeys, challenging circumstances, long waits in fog and whiteouts, but the idea of being lost or unable to find one's way is without basis in experience, language, or understanding. That is until recently.

In searching for the disabled snowmobile, the young man's father was not asking anything unusual. He gave his son oral directions, which included Inuit place names and references to wind directions. The son did his best, but after hours of searching in unforgiving conditions he returned distraught to Igloolik. Aporta had been traveling with the father earlier when the machine broke down and had recorded the location with a portable global positioning system (GPS) receiver. Remarkable for its small size and ease-of-use, the handheld device belies a complicated system of satellites, ground stations, control networks, electronic receivers, and communications protocols. Together, this system provides location in three coordinates accurate to within a few meters anywhere on the surface of the planet[32]. Working with a straightforward electronic mapping program, Aporta printed a map with the exact location of the disabled machine. With map in hand the next day, the young man went directly to the location.

This is not a simple story of the triumph of technological sophistication or a lament for the demise of traditional knowledge. Both the young man and Aporta would be lost, literally and figuratively, without the GPS. As with any complicated device, a mere glitch in its operation—a dead battery, loss of the device, a malfunction—immediately turns a circumstance of technological security into a potential disaster. While the technology of GPS is remarkable in locating specific sites, recording a travel route, establishing relationships of known points, or finding a route home, it does not, of course, provide the knowledge of how to travel safely. Inuit wayfinding methods are burdensome to learn,

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[32] This is especially true since May 1, 2000 when the United States government removed selective availability that previously caused readings to fluctuate by as much as several hundred metres

requiring years of quiet tutoring and experience, but are perfectly reliable. This is the kind of knowledge that cannot be acquired from books, maps, or electronics.

Much has changed in Igloolik region in the last forty years as Canadian government modernization and resettlement programs ended centuries-old nomadic living patterns abruptly. Many elders who are active today were born on the land, living according to long-established ways. The arrival of formal education, stores, commercial transport, electronic communications, wage labor, and so on has transformed the social patterns and structures. Adaptation is found in every aspect of life: people still hunt for food, for example, but often squeezed into shorter weekend trips by mechanized vehicle. It is more difficult to communicate Inuit methods of moving about the land and sea, and many younger people do not have the depth of knowledge to move about safely. Some blame technologies such as GPS for providing ultimately undependable advice and eroding knowledge of the past, but GPS has also been used recently in Igloolik to rekindle interest in Inuit wayfinding methods and traveling techniques (see page 161).

This complex story reveals several questions about technology that we address in this paper. First, we describe the deployment of GPS technology in a region of the circumpolar north where it has been rapidly adopted and widely used. Our discussion of the changes wrought by GPS is presented against the backdrop of interacting social and technological change. Despite the power, allure, and rapid distribution of GPS worldwide, few people have examined its social and cultural implications. Second, we found that understanding GPS in a fast-changing social and technological environment compelled us to search for models of technology that depended on the patterns created by devices rather than the devices (or systems of devices) themselves. We present a paradigmatic theory of technology based on recent work in anthropology and technology studies. In doing so, we step around some classic and unsatisfying accounts of technology that portray devices and systems either as a blessing or a curse. Such hard-edged determinism forecloses on the nuances that make some systems salutary and others destructive. Third, the ambiguity we experienced in studying GPS in Igloolik led us to a distinction between technology that is physically and socially engaging and technology

that disengages experience of the land, people, and local knowledge. What creates the conditions for evaluating the role of a technology depends on the extent to which people are engaged with the social and natural conditions that define their social reality and belief systems. Hence, notwithstanding a host of changes in lifeways that the Inuit of Igloolik have adopted (or had forced upon them), there are some changes that separate them from their cosmological, ontological, and social legacy and others that engage people more deeply. There is also a risk of turning landscapes into constructed entities or commodities, which is what happens figuratively when we are too attentive to the map and not the territory.

The central questions that must be asked of GPS, and indeed all technology, is how can it respect engagement? When is loss of engagement crucial? How are adoption and rejection of new devices negotiated? Failure to address such questions will lead to the erosion of social integrity and understanding of the significance of the places that support us. Indeed, our incapacity and inexperience in dealing with the moral and material consequences of new technology has created a hazardous laissez-faire approach. These questions can be asked anywhere, too, but in few places are the answers more striking and consequential than Igloolik.

Wayfinding among the Inuit

Inuit wayfinding and orienting methods have received the attention of ethnographers, explorers and popular writers, attracted by the fact that Inuit usually travel across extensive and sometimes indistinctive territories without using maps or instruments. Focusing on diverse geographic locations across the Arctic, the studies by Nelson (1969), Carpenter (1973), and Simeon (1983) constitute some systematic attempts to describe this aspect of Inuit culture. Valuable information is also found in ethnographic studies and explorers' reports, notably in Parry (1824), Lyon (1823), Boas (1888), Mathiassen (1928), Rasmussen (1929), Stefansson (1912), Hall (1864), and Freuchen (1961). In Igloolik, MacDonald (1998) and Aporta (2002a, 2002b, 2003) have described the different aspects of Inuit spatial orienting and wayfinding methods.

Inuit orient themselves on the land by understanding wind behaviour, snowdrifts patterns, animal behaviour, tidal cycles, currents, and astronomical phenomena (MacDonald 1998). One of us (Aporta 2003) has shown elsewhere how all these methods are understood and used in connection to a few spatial referents of which the most important is the one determined by prevailing winds.

MacDonald identified vocabulary that recognizes 16 bearings in relation to four wind directions: Uangnaq (WNW), Kanangnaq (NNE), Akinnaq (SSW), and Nigiq (ESE). These bearing constitute a wind-compass that Inuit use to situate objects, describe locations, and locate people's relative positions while traveling. Winds are not, however, reliable indicators in themselves as wind variations or shifts go frequently unnoticed. Inuit rely, therefore, on snowdrifts shaped by different prevailing winds and showing several distinctive forms. One in particular (the uqalurait), shaped by the prevailing wind Uangnaq, is the principal orienting aid in Igloolik, pointing WNW.

Unlike other regions of the Arctic, ephemeral maps, drawn on the snow or the sand, have rarely been used in Igloolik. Even today, older hunters scarcely ever use maps to travel, as trails and places are described by using precise spatial terms available in the Inuit language (Inuktitut), place names, and some references to known spatial frames, especially wind directions. The Inuit in Igloolik do not have institutionalized training related to navigation. Igloolik hunters learn from their own experience while traveling with knowledgeable elders and through conversations with experienced relatives and friends. Each hunter's learning process, however, depends on his own context (MacDonald 1998). A common training method consists of asking younger boys where such and such places are located. These questions are asked during tea-breaks while traveling with snowmobiles, in a pause after a hunt, during conversations at camping spots, after pursuing a caribou or a walrus. Before snowmobiles came into use, the slower and more silent travel pace of dog teams made traveling itself an ideal context for teaching and learning geographic and other environmental knowledge.

GPS technology in Igloolik is recent, with the first units showing up in the mid-1990's. Use was tentative at first, especially given the need for differential correction, an additional complication that was required by GPS users before 2000 to correct for deliberate random error in the satellite signals. GPS was originally developed by the United States as a navigation system for military purposes (which explains the pre-2000 signal error). Later, it was adopted by surveyors for navigation and to establish precise positions. The virtue of GPS is its extraordinary accuracy, with professional units capable of real-time measurements with centimetre accuracy in three dimensions. GPS receivers are primarily used for navigation and surveying, but its applications are widespread from robotics to telecommunications, or wherever spatial data are required.

As a navigational instrument, GPS is not affected by the proximity of the magnetic North, a problem that undermines the usefulness of the magnetic compass in Arctic latitudes. The use of GPS in the Arctic, however, does face some limitations related to very cold temperatures and lack of light in the winter. Extreme cold makes it a challenge to keep the batteries warm (this problem is usually solved by placing the unit underneath several layers of clothing). Even if one manages to keep the batteries warm, under usual winter conditions, the screen freezes up in a matter of a few seconds and only basic operations can be performed before the information on the screen becomes illegible. Despite these limitations, the use of GPS is steadily growing in Igloolik.

In 1998, when this research was started, approximately forty Inuit hunters owned GPS receivers in settlement. Of this number, roughly 20-30 were actually using or learning to use them. Several of the units had been given away by a manufacturer of All Terrain Vehicles (ATV) with the purchase of a machine. Some hunters had purchased their units from the two stores of the town, some had ordered them through the Igloolik Research Centre, and others had obtained them directly through mail order sports supply outfits.

These early models of GPS required knowledge of geographic coordinates and some training to operate them. The Igloolik Research Centre, developed an educational CD-ROM and offered courses in the community about the use of GPS. Both the CD-ROM

and the courses were offered in Inuktitut and focused on map-reading, coordinate systems such as lat/long and UTM, and the operational basics of GPS. The Canadian Rangers (a volunteer militia) have also organized several courses of map-reading and GPS using. High school teachers, out of personal motivation, have also included GPS in survival courses. Hunters of all ages are enthralled by the device's ability to store precise locations. Most hunters, however, found the geographic information required to operate these earlier receivers too abstract, and some of them barely used their GPS. Some GPS receivers were never initialized (never used for navigation).

Since 2000, the situation changed substantially as the Hunters and Trappers Association made available a new GPS model at retail price. The cessation of differential correction in May 2000 meant that handheld units costing less than $500 could deliver highly accurate, real-time spatial information. Most contemporary models provide a user-friendly operative system and map display capabilities that offer good topographic detail when the base maps are uploaded from a computer (a service offered without charge at the Igloolik Research Centre, at the time of this study). Other models with map displays are also ordered from the local stores and through mail order, which makes it difficult to know the actual number of active GPS receivers in town. We can safely say, however, that the number of GPS units is continually growing, that most people in town have access to GPS receivers at least through members of their family, and that every hunter in town has seen GPS at work.

Concern arose in the mid-1990's that younger, less-experienced hunters were beginning to rely too heavily on mechanized conveyances and electronic navigational aids. Without a background of the Inuit long-established wayfinding and survival skills, a single mechanical failure—the breakdown of a snowmobile—could end in a catastrophic accident. The circumstances grew serious with several fatal and near-fatal incidents that were highly publicized at the local level. Some attempts were made to rekindle interest in Inuit methods, but such approaches did not always work with younger travelers thoroughly immersed in new contexts produced by life in town, electronic communication, and different priorities. The Igloolik Research Center initiated a training

program for GPS use, and produced computer-based course materials to supplement the training sessions. A premise of the course was the reintroduction of traditional knowledge through navigational training on GPS: the fascination with GPS could be elaborated into a comprehensive understanding of travel and survival in a severe landscape. No formal evaluation of the program is available, but there is evidence that the approach did in fact inspire a rise in the number of GPS units in active use and an interest on Inuit wayfinding methods.

It is difficult to describe a definite pattern or a way of using GPS receivers in Igloolik, as the circumstances of each hunter differs. As a rule, Inuit who have not gone through formal schooling (usually unilingual Inuit) and who grew up on the land and not in settlements, do not use GPS receivers. Knowledgeable full-time or part-time hunters of different ages use GPS as a supplementary navigational tool. Younger hunters, with less knowledge of the Inuit methods described in the previous section, are starting to use GPS more intensively, and are already changing some travel patterns.

In general, hunters use GPS receivers mostly to create waypoints for starting or ending points of their trips. Only recently are some hunters beginning to record trails with the tracking or route functions of their GPS. In the winter of 2000, a hunter in his mid-forties had created the following waypoints in his GPS: seven hunting destinations (mostly cabins); the settlement of Igloolik; one caribou cache; and one broken sled. From conversations and interviews with several hunters the waypoint list of that hunter's GPS seems quite typical. Although some hunters are able to enter the coordinates for the waypoints manually, in advance of a trip, most of them create the waypoints on location, simply pressing the *Enter* or *Mark* at the bottom of their receivers.

Iyerak, a knowledgeable hunter in his late 40s, reported that on one occasion he was traveling with an elder (Lukie Airut) during a bad blizzard. They had been hunting caribou, and Airut was leading the way back to the cabin (on the southern shore of a long lake) under very bad visibility. Airut knew that Iyerak had stored the cabin's location in his GPS but did not ask for it until the very last. Iyerak remembered that "the wind was

from the southeast. And going down that slope there were hills and there were rocks, and we only could see a few feet away. To me, it looked like the wind was changing every few hours, and since he was the elder we were following him... And only when he had come to the lake where the cabin was, he asked me to take [the travel party] to the cabin, because with my GPS I could go right to the cabin. But if we hadn't used it we would have guessed and used the coast to get to the cabin" (Iyerak, 2000). Iyerak's story is typical of the way many Inuit use their GPS receivers. Even under bad visibility, blizzards provide some spatial clues (the direction from which the wind is blowing), which aid experienced hunters to find their way and keep their bearings. The precise location of a particular spot in a blizzard, however, is much more difficult to determine, and must be done in relation to a larger target (the lake's southern shore, in this case). In some situations, hunters would simply give up and set a camp until the visibility improves. GPS, on the other hand, allows traveling and reaching precise targets under any type of visibility.

During a February 2001 caribou hunting trip in which Aporta participated, the hunter leading the group was forced to leave a sled in one of the flattest and most visually indistinctive regions of Melville Peninsula. Aporta made a waypoint with his GPS, storing the precise location of the sled. Two days later, the hunter, knowledgeable of the fact that Aporta had stored the location with his GPS, led the way until he reached a place where he knew the sled was approximately located. Without the GPS he would have traveled in concentric circles until he had found the sled. He asked Aporta, however, to lead the way from there. The GPS revealed that the sled was at 0.9 km in a northerly direction. To remember the sled's approximate location, the hunter had looked at the position on the horizon of the only visible landmark (a hill called Kinngatuaq), estimated the distance (in relation to the relative size of the hill), and determined the relative position of the sled through the use of snowdrifts.

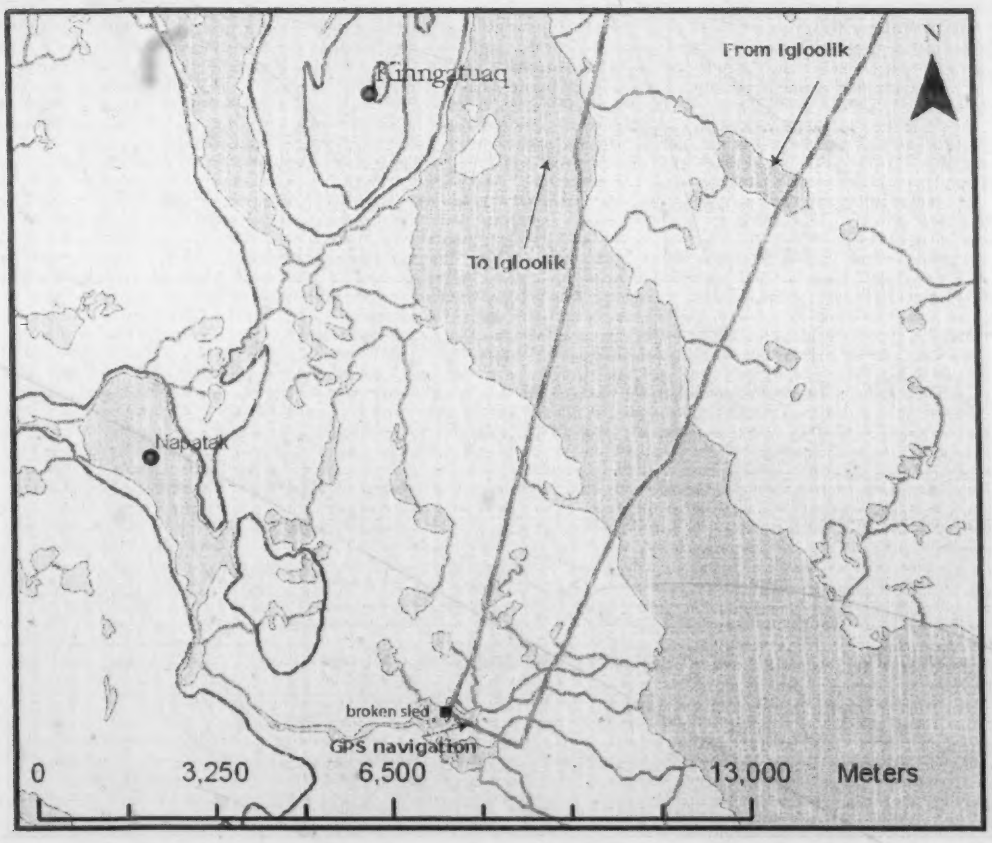

Figure 6-2: The trip in search of the broken sled was recorded with a GPS unit, as well as the location of the sled.

Similarly, some hunters are creating waypoints at their meat caches or at places where they have left a piece of equipment.

One of the activities most frequently mentioned by GPS users and in which the receivers are most appreciated is walrus hunting in the summer. Walrus is one of the main food sources in Igloolik and hunting them is an expensive activity requiring large quantities of fuel for long boat trips. Most walrus hunts begin at a summer camp, southeast of the present settlement. Hunters leave the camp when weather and tides permit, and usually head southeast. Walrus are usually found resting on floating ice, far away from the coast in a region where landmarks cannot be seen as referent points for navigation. One of the

problems of walrus hunting with motorboats is to calculate how much gas one needs to bring along to be able to hunt, load the walrus, and come back to camp. A successful hunter needs to have enough room in the boat to bring the animal back without capsizing and at the same time to have enough gas to come back to the camp. A good estimate of gasoline consumption, therefore, is crucial.

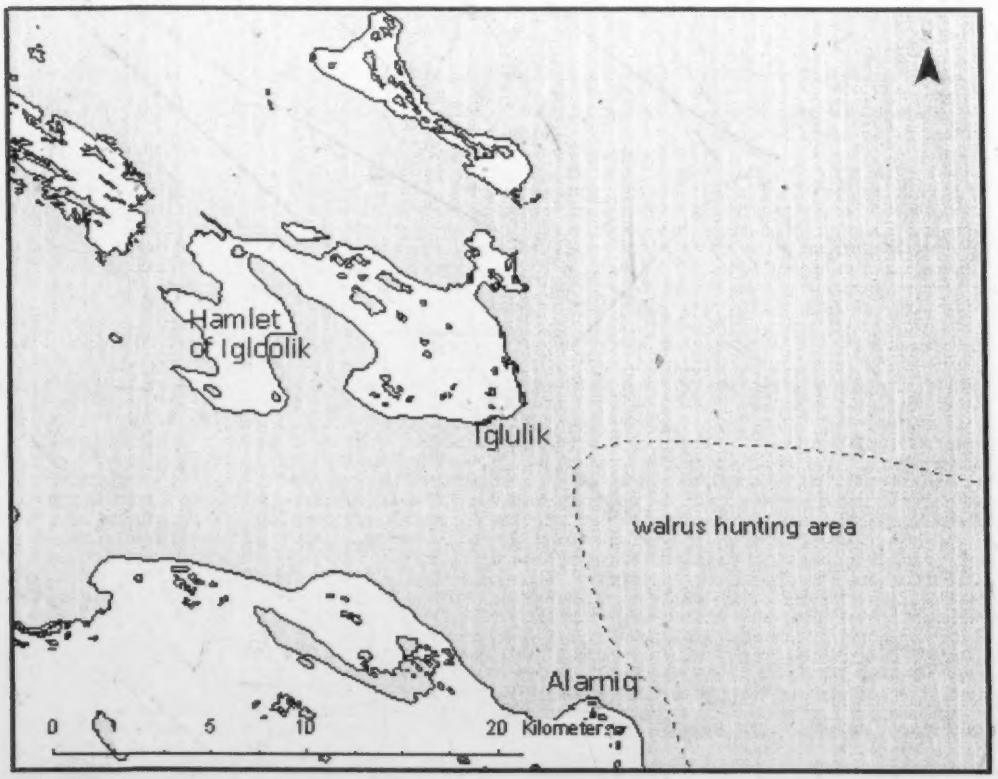

Figure 6-3: Igloolik hunters usually depart from the summer camp Iglulik to go looking for walrus

Knowledgeable elders usually participate in the walrus hunts, and they can find their way back by using different environmental clues such as the sun's trajectory, bird flight patterns, tides, and the direction in which sea mammals swim. Experienced hunters are able to maintain their orientation at all times, even after chasing a walrus in circles, and turning around floating ice. A good hunter finds his way back to the camp, usually using

a similar technique as the one used during blizzards (described above). The hunter will sight the island's shore and then correct bearings to find the camp. Several gallons of valuable gasoline are sometimes used in bearing corrections, which are protracted if the visibility is poor.

GPS gained rapid popularity in the community partly because of its ability to bring walrus hunters back to their camps in a straight line regardless of environmental conditions. George Qulaut, a knowledgeable hunter and GPS user in his late forties, recalled that when he saw a GPS for the first time "I was not very optimistic; I was hesitant. If I remember correctly, I think I told [the director of the Igloolik Research Centre] that I would never try to use a GPS. I wanted to use the traditional knowledge. But after seeing it how it worked [during summer boat travel], I got very curious and interested, and I wanted to compare it, so I became attached to it" (Qulaut 2000).

The first time Qulaut saw GPS at work was during a walrus hunt, in which he was driving the boat. The rest of the crew comprised his brother-in-law, his uncle Satuqsi (an elder) and a younger relative. It was foggy, and his brother-in-law had a GPS receiver. "We had two walrus on the canoe, and there was a lot of … ice close to the shore. And [we] were going along Alarniq (see figure 6-3), and then trying to come back to Igloolik. It became very, very foggy. And it was dead calm, absolutely no wind." The travelers found floating ice that they recognized as being recently detached from the coast. This clue allowed Satuqsi to determine where the coast was and also the approximate location of their final destination: Igloolik. Qulaut's brother-in-law, in turn, used his GPS to point exactly where Igloolik was. Satuqsi agreed with the instrument's reading but insisted in following the coast because he anticipated they were going to find floating ice on their way if they followed a straight line to the settlement. "Both were correct all the time, [but] if I had followed the GPS, it would have taken me further out, because we would have been stuck between the ice... so [the GPS] would have been okay if there was no ice, and [the elder's decision] was okay because there was ice, so that was very interesting for all of us." (Qulaut 2000)

Fog is considered the most demanding orienting challenge by Inuit hunters in Igloolik. Even experienced hunters prefer to stop until it clears up, and only those who have the knowledge to read the tides can actually find their way while traveling by boat in open water. During thick spring fog, while traveling on the sea ice, establishing bearings is virtually impossible, as all spatial referents and all environmental clues disappear. GPS receivers, which do not depend on environmental clues but satellite signals to determine locations and bearings, are ideal instruments under such conditions.

One of the most respected elders in Igloolik, Herve Paniaq, stated that under foggy conditions and no wind "I would stop and wait for the fog to lift" (…). "Nowadays – Paniaq added- people can travel even in the fog using a GPS, and get to a place where they were trying to go" (2000). Not surprisingly, nearly all the hunters consulted said that fog is the circumstance in which GPS becomes more useful. Theo Ikummaq, for instance, a knowledgeable hunter and an occasional GPS user, said that he would only use GPS if the need arose, "and the need would arise if I am traveling in a fog, and if I don't know where I am going. For example in a calm day in a boat, where you don't have a ripple, seaweeds are not there, then it would become handy" (Ikummaq 2000).

Recent models of GPS receivers with map displays allow a new way of using the instrument. Some hunters are using map-enabled models of GPS to see where they are, as their location is shown on the map display of the GPS. The GPS user simply turns on the receiver and waits until the unit acquires satellite signals and shows him his position in a built-in map. This way of using GPS does not require any knowledge of geographic coordinates but only an understanding of bird's eye view of the territory and its relationship with the surrounding environment. A hunter in his early thirties said "I just turn it on, and I look at the map. I guess I can tell by the shape of the land where I am; then I don't usually use the numbers, just look at the maps". He had owned an older version which "worked pretty well but I never really used it" (field notes, 2001). This mode of using GPS without knowing much about geographic coordinates, however, is not unique to the new models with map displays. As described above, most hunters create their waypoints in location (instead of entering the coordinates manually). If

circumstances prompted them to use their receivers, they would not navigate by coordinates but just by following the direction indicated by the GPS arrow.

The widespread use of GPS among the hunters of Igloolik has taken less than a decade. Many hunters (and other travelers) have adopted GPS units either for highly specific purposes—emergencies, specific environmental conditions—or regular aids to wayfinding. In the hands of experienced hunters, it seems generally the case that GPS units are used only occasionally. Younger hunters, especially those who have relatively little knowledge of Inuit well-established wayfinding methods, are more reliant on GPS. What is less clear is the extent to which GPS has either enabled and enhanced Inuit methods of wayfinding, or disabled long-term local knowledge. Those who are enthusiastic about GPS seem to regard it as an extension of classical tools, that is devices that amplify human ability. Those who are suspicious or circumspect are worried about the loss of understanding of the land handed down from one generation to another or the interlocking consequences of multiple technologies such as GPS, snowmobiles, radio communication, and computers. Both accounts are plausible, but it strikes us that despite remarkable adaptations it is difficult to absorb the rapid introduction of new technologies and hold on to time-honoured practices.

A difficulty in understanding this tension is manifest in underlying theories of technology. Straightforward instrumental—technology-as-tool—views tend to underemphasize the consequences of new developments. Newer, more sophisticated accounts of technology, especially those found within anthropology, offer a richer perspective, but do not provide clear theoretical tools to identify and understand the patterns that are produced and reinforced by contemporary technologies.

In the next section we review several accounts of technology, and favour a theory developed by Albert Borgmann: the device paradigm. We think that this theory, largely unknown inside anthropology because of its origin in philosophy of technology, offers much in deciphering the complexities of technological introductions, such as the adoption of GPS use in Igloolik.

The Character of Technology

Technology is an elusive subject. Anthropologists have approached it from various perspectives including material culture and the formation of sociotechnical systems (Pfaffenberger, 1992; Lemonnier, 1992; Escobar, 1994). Most contemporary definitions include economic, cultural, social and environmental settings as integral to what technology is. This section begins with a brief review of various approaches taken by anthropologists. As important and useful as these concepts are, we propose stepping outside anthropology to incorporate the theory of the "device paradigm," which emanates from contemporary philosophy of technology. The device paradigm has two distinct advantages: it is prescriptive as well as descriptive, and it allows the development of distinctions between those introductions of technology that are community-affirming and those that alienate people from their places. It is this sense of engagement and disengagement that we believe is crucial in understanding the consequences and opportunities for devices such as GPS in Igloolik.

Several assumptions have blocked anthropologists from developing a complex theoretical approach to technology over the last century. Most significant perhaps was the tendency to consider technology simply as material culture or artefacts. This reduced the theoretical importance of technology in anthropological research, relegating the study of technology to museums (Pfaffenberger 1992: 491-492). The "artefact-collecting days of ethnology" (Lemonnier: 1992:12) resulted in museum collections where the specimens of a social group's material culture were exhibited, lacking most of their contextual information. A second assumption considered technology as an indicator of social complexity through a categorization of artefacts from simple tools to complex machines. This implies assessing the dynamics of technological change as an evolutionary process, establishing a relatively linear connection between, say, a stone arrow-head and a modern missile. This assumption has been commonly portrayed in introductory anthropology textbooks, and is found in most popular accounts of technology. One of the most systematic attempts to measure the complexity of technology was that envisioned by

Oswalt (1976), who proposed to define the degree of complexity of tools through the use of what he called "techno-units." Ingold presented a comprehensive critique of this approach, concluding that "comparisons based on the structural properties of the tools themselves can be misleading," and adding that "returning the objects to the contexts of their use reveals a different picture" (2000: 367).

Finally, a third assumption consists in believing that the driving force of technology is almost impossible to resist. Heilbroner famously synthesized this argument with a question in the title of his article "Do Machines Make History?" (1967). Technological deterministic approaches hold that the introduction of a new technology allows inevitable and predictable change (Smith and Marx 1995). This approach can be found in some classic works of anthropology (e.g. Steward and Murphy 1977[33]). Deterministic accounts of technology can also be found in more contemporary studies, both inside and outside of anthropology. Nelson, for instance, predicted "the death of hunting" among Ulgunigamiut of Northwest Alaska due to the rifle and a new cash economy (1968: 383-384). Pelto's study of the introduction of the snowmobile in Lapland described how "this picture of 'peaceful coexistence' [between herders and their animals] was abruptly altered when snowmobiles came into extensive use," (1973: 100) and predicted irresistible changes that apply not only to snowmobiles but to "a process that is likely to occur when *any* [original emphasis] major contemporary technological innovation transforms a local economic system (1973: 178).

Accordingly, technology is a force on its own (first assumption), that evolves from simple to complex forms (second assumption) and whose driving force provokes inevitable and predictable change (third assumption). The main problem with this approach is that technology is considered on its own, without the contexts and activities

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[33] More specifically, Steward and Murphy referred to the impact of outside factors among the Mundurucu of the Tapajos River in Brazil and the Northeastern Algonkians in Canada. The authors concluded that when industrialized goods are introduced to certain societies, "the structure of the native culture will be destroyed, and the final culmination will be a culture type characterized by individual families having delimited rights to marketable resources and linked to the larger nation through trading centers" (1973: 178).

surrounding their production, use and exchange. In other words, this approach separates technology from culture and ignores the complex processes that take place when humans produce, perceive and use technologies. It has led to a pervasive view of technology-as-tool, that despite regular correctives remains pervasive in the public mind if not in the habits of mind of many scholars. There are two further concerns. The first, raised primarily by historians and philosophers, is the tendency of such deterministic views to produce a neutral outlook on the moral consequences of technology, summed up in the epithet, "guns don't kill people, people kill people." Such a perspective disguises the complicated relationships that exist between the intentions buried inside devices and the settings that define their use. Deterministic views of technology tend to reify artefacts, which gives technology an exclusively materialistic bent. However, we need only look around to realize that many of the most pervasive and effective technologies are those that have little or no direct material connotation: computerized grade sheets, the internet, the imposition of discipline inside organizations, and so on.

Pfaffenberger (1992), Latour (1993), Lemonnier (1992, 1993), Hess (1993) Escobar (1994), and Ingold (1993, 2000), to cite a few, have made technology a prominent topic of anthropological inquiry. Lemonnier made clear that "for the ethnologist, and for the archaeologist and historian as well, technologies are like myths, marriage prohibitions, or exchange systems—social productions in themselves" (1992: 1-2), and Ingold constructed a parallel between the use and production of tools with the giving and receiving of gifts, because "divorced from the contexts of productions, the tool reverts to its original condition as an inert object; likewise the gift is inert outside the social context of exchange (1993: 440).

The interpretation of technology in context (and of context as part of what technologies are) requires more complex theoretical approaches and a re-definition of technology as a theoretical object. Pfaffenberger proposed the concept of sociotechnical system to refer to "the distinctive technical activity that stems from the linkage of technique and material culture to the coordination of labour" (1992: 497). Lemonnier used the concept of technological actions, which takes into account the social representations or phenomena

that goes far beyond mere action on matter" and that considers how "societies seize, adopt or develop certain technological features, and dismiss others" (1993: 6). Basalla provided a more general definition of technology stating that a human technology is a "material manifestation of the various ways men and women throughout time have chosen to define and pursue existence" (1988: 14).

Technologies are, in fact, defined by their contexts of creation and use in different individual, social, economic and cultural settings. An instrument (material or non-material) becomes part of the broader definition of technology when the actors and their contexts are included. The idea that context is an essential aspect of technology is very important because it recognizes, first, that the interests and values of individuals and societies and sometimes the physical setting of places play a role in the development and use of technologies and are part of what technologies are, and, second, that some aspects of technologies will change when other individuals and other societies in other geographies adopt them. The introduction of the magnetic compass, for instance, did not affect vernacular navigational knowledge of Inuit hunters and Puluwat sailors. On the contrary, Inuit hunters used compasses to foresee ice movement in Alaska (Nelson 1968) and Puluwat navigators used them to detect variation of boat courses in the South Pacific (Lewis 1994: 300). Technologies, indeed, are not only adopted but also adapted.

Most contemporary analyses of technology recognize social changes brought about by new technologies, but indicate that such changes are not predictable and that there is latitude in the way societies develop and adapt technologies. Appadurai, for instance, identified these processes as "resistance, irony, selectivity, and, in general, agency" (1996: 7), Lemonnier as technological choices (1993), Schaniel as appropriation of technologies, Pfaffenberger as technological adjustments and reconstitutions (1992) and Kopytoff as how technologies are culturally redefined (1986: 67). In this sense, technologies such as the snowmobile, the rifle or the GPS, can be integrated to, say, Inuit practices, from the moment they are appropriated, adjusted, and culturally redefined.

Relatively little communication has occurred between anthropologists interested in technology and theorists from other disciplines and perspectives, or at least not to the same extent of the interdisciplinary communications among scholars interested in science (e.g. Nader 1996, Traweek 1988, Gusterson 1996). Scholars from different fields (science and technology studies, philosophy, and sociology) have suggested other ways of understanding technology that place material culture in the wider context of its production and use and recognize multiple variations in the ways technologies are adopted. Outside anthropology, other authors have made considerable contributions to a better understanding of technology through the coining of such concepts as technology-practice (Pacey 1984), technology as a mindset (Franklin 1999), political properties of technologies (Winner 1989) and the phenomenology of technology (Idhe 1973).

Much has been accomplished as regards developing a more sophisticated theoretical understanding of technology, of which the previous section offers only a brief overview. The importance of unveiling the different aspects of technological phenomena is enormous. We believe, however, that a further step is needed if one is to recognize and understand the patterns that emerge from our interactions with contemporary technologies. We propose a theoretical framework provided by a subfield of contemporary philosophy--philosophy of technology--to advance a more comprehensive understanding of technology, especially in relation to our case study.

In particular, we find the "theory of the device paradigm" developed by American philosopher Albert Borgmann (1999; 1992; 1984), especially useful. Borgmann's work is celebrated as bringing forward one of the few comprehensive, prescriptive theories of technology that moves boldly beyond conventional descriptive accounts (Higgs, Light and Strong, 2000). His work takes inspiration from traditional phenomenological accounts such as Heidegger, and a wide variety of contemporary scholars in philosophy, technology studies, history, sociology, and anthropology.

Borgmann's crucial insight is that the locus of attention in understanding technology should be directed to the interaction people have with devices and systems and not the

devices and systems themselves. All devices operate within a social setting. If that social setting is constituted of voluntary relations that manifest engagement with deeply held and culturally variable notions of a good life, then the device is appropriated to that setting. Such engagement is typical of devices that evolve within a social setting and are part of the tradition belonging to a group of people. An old coffee grinder, for example, handed down in a family bespeaks a continuity in the social consumption of coffee, and the labor and noise recall many occasions when that device has gathered family and friends. It orients social gatherings and at the same time enables rather than distracts the central purposes. This harkens back to the classic relationship between means and ends; they are in appropriate relationship when people are able to guide the means toward meaningful ends, and not the other way around.

There is a distinctive and constraining pattern that describes what has become a pervasive decomposition of engagement. The complicated and delicate social relations that center on things are reduced to machinery and commodities. An electronic coffee grinder or more significantly an all-in-one coffee machine replaces a thing, for example the hand operated coffee grinder. At the mere press of a button, coffee beans are ground, a precise portion deposited into a receptacle, steam is injected through the beans, and a portion of coffee results automatically. A cup of coffee is the commodity that results from an increasingly hidden process or machinery. The consumer need not be aware of the source of the beans, the social and environmental consequences of their production, the construction, operation and maintenance of the machine, and the skills and labor involved in producing a good cup of coffee. The pattern of social relations has shifted, and the concepts of tradition, continuity, resourcefulness, and skill are subordinated to the smooth operation of an alluring device.

Borgmann calls this reduction of things to devices the "device paradigm" to highlight the archetypical character of such patterns. However, the pattern is not restricted to devices per se. The systems of contemporary life, including belief systems, the way we relate to time, travel, friendship, love, and identity are shifting in favour of an increasing emphasis on commodities, the recession of machinery, and the diminution of authentic forms of

engagement. This paints a dark portrait of technology: why would such a reductive pattern be alluring? The promise of technology to relieve labour, increase capacity, and concentrate power (literally and figuratively) is apparently boundless. Problems with devices and systems are attributed not to the extrinsic character of social patterns but to the intrinsic capability of those devices and systems: computer interconnectivity will be seamless and simple once everyone is attached to wireless networks; cars will offer the same power with negligible pollution with the next generation of drivetrain technology; photography will be transformed with high resolution digital devices; social justice will rise in prominence with the availability of seamless electronic communications. The promise is undeniable, but it belies the transformations that take place in the surrounding social relationships. We are taken in by the promise of better and smoother devices without stopping to assess the consequences for social relationships and connections to landscape.

Several aspects of Borgmann's theory have been the focus of recent debate (Higgs, Light and Strong 2000). One of the main objections to Borgmann's concept of the device paradigm is the possibility that technological devices (e.g. the electronic coffee grinder described above) can still become part of meaningful and engaging practices. In other words, the sharp distinction between things and devices is debatable when considering specific examples (many of them provided by Borgmann himself (1984)). Scholars such as Appadurai, who has illustrated how things move in and out of their commodity state (1986: 13), challenge rigid definitions of what counts as a device and what is an engaged object or practice (what Borgmann terms a "thing"). According to Appadurai, "commodity is not one kind of thing rather than another, but one phase in the life of some things" (1986: 17). GPS is, in fact, a good example, as some hunters are utilizing it *in lieu* of Inuit wayfinding techniques, while others seek its potential in enhancing Inuit wayfinding knowledge and methods. However, it should not be overlooked that each GPS device carries with it a complicated overlay of dependent systems and practices: satellites, communications and control systems, research and development, distribution systems for GPS units, training, warranty and repair infrastructures, and so on. Furthermore, as we will show in the next section, we should still ask whether GPS can

create conditions for disengagement with the surrounding landscape. Borgmann's theoretical contribution relates for our purposes most importantly to the unveiling of a general pattern by which contemporary life takes place in any setting in which devices are prominent, and especially in providing an analytical tool to understand human-technology interactions.

Anthropologists have in fact put forward some theoretical approaches that treat technology in a paradigmatic way, and whose main claims are not far from the theory of the device paradigm. Ingold, for instance, stated that through technology (in Ingold's terms, technology refers to modern technology) "the human subject has been drawn from the centre to the periphery of the labour process" (2000: 316), and that "the goal of modern technology has been to override the constraints of the natural world, to bring its forces under control so that the rhythms of society can be brought into conformity with an imposed, artificially contrived schedule" (2000: 326), a clear reference to commoditisation of time. Escobar also said that any technology "emerges out of particular cultural conditions and in turn helps to create new ones" (1994: 211). Escobar's concept of cyberculture in fact refers to the commoditisation of life, since "we increasingly live and make ourselves in techno-biocultural environments structured by novel forms of science and technology" (1994: 214). In spite of this increased attention to technology inside anthropology and in other human sciences, the level of analysis has not kept pace with the rise of technology. In everyday situations we often wonder how well we are able to manage our relationship with new devices, and, especially, what aspects of our lives are changing, and to what degree, as new devices come into use and older practices and instruments become obsolete.

Engagement

In advancing a paradigmatic view of technology we realize that the disciplinary tension separating anthropology and philosophy is exposed. Philosophers are concerned primarily with explanation and theory, anthropologists with interpretation and description. A strong

dialectic between these opposing traditions creates, we believe, the best of the human sciences. The problem we found with particularistic accounts of technology is that they offer nothing by which people can discriminate how a rapidly changing technological field is affecting their lives. This was the case with anthropological accounts that either ignored judgement entirely or offered unitary influences of a device. In contrast, philosophers have seldom reached out to examine how specific theories of technology operate in communities. A paradigmatic approach takes the best of both by asserting a general pattern without suggesting a determinate outcome. Moreover, the locus of a specific community matters most in deciding how it is that engagement with landscape is realized.

When interpreting Igloolik hunters' use of GPS in the context of the approaches produced by anthropologists of technology, it becomes clear that the central question should not be whether GPS is or is not displacing Inuit traditional knowledge and skills. This question is inappropriate because GPS cannot be analyzed as an isolated artefact, and because the definition of a traditional era previous to GPS is doubtful. Furthermore, resistance is part of the way in which new technologies are appropriated. These assertions are important but are still insufficient to fully and significantly explain the effects of GPS in the way Inuit hunters relate to their environments.

GPS is better understood if considered as an instantiation and exemplar of the device paradigm, which is already present in various aspects of Igloolik life through the commoditisation of time and space. GPS is being used (often in creative ways alongside other Inuit methods, and sometimes replacing previous ones) to deal with situations that in themselves have been created by this paradigm: the need to hunt on weekends, regardless of weather conditions because of work and school obligations; the lack of a detailed knowledge of the surroundings due to fast transportation and less time on the land; and the need to rationalize gasoline use. GPS is a technological solution to solve problems that have been created by the commoditization of life or, in Borgmann's terms, by the device paradigm.

In the keynote address that Ronald Abler[34] delivered to the Second International GPS/GIS Conference in 1992, he described the combined use of GIS and GPS as the fulfillment of the geographer's dream: "the need to fix the position of things in terrestrial space that has animated the work of geographers from the origins of the discipline" (1993: 133). He then went on to cite Van Demark's statement, that "the GPS receiver becomes a digitizing cursor and the earth is the digitizer's table" (1993: 135). But what if in that perfect geographical world created by GPS and GIS, the boundaries between the map and the territory become blurred, and something important about the human experience of space becomes lost? Do some technologies disengage experience of the land, people, and culture? Following Abler's remarks, it would seem that these new geographic technologies may have the potential to transform local geographies into standardized and measurable space (see also Sahay's study of the introduction of GIS in India, 1998). Such prospect has prompted several Inuit in Igloolik to express some critical views of the introduction of GPS among younger hunters.

In March 2001, during a meeting of the Inullariit Elders Association where Aporta presented some of the results of his research, the elders attending the meeting spontaneously started a discussion on GPS, unanimously expressing their admiration for the navigational instrument and their worries for its potential effects in younger generations (Aporta's field notes, 2001). Their main concerns were related to three issues: 1) the fact GPS can break, and it would be wrong to rely on an instrument that breaks, 2) that some of the knowledge and skills they had learned from older generations would get lost, as younger people would rely more on GPS, and 3) that inexperienced hunters using GPS may fall into thin ice or go by very inefficient routes just for following a straight course suggested by the GPS. Similar concerns were expressed by younger, experienced hunters and occasional GPS users such as Qulaut (2000), Iyerak (2000) and Ikummaq (2000).

Alianakuluk, an elder who is not a GPS user himself, expressed a very critical position.

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[34] Abler was, at the time, the Executive Director of the Association of American Geographers

> As for myself I regret the fact that they are abandoning their Inukness, the vast knowledge that Inuit hold are just being put in the back burner; it is for this I regret the fact that knowledge is going to be lost. Of course people are free to do as they wish. The wisdom and knowledge of the Inuit are being diminished with these gadgets. It is too, too bad. The knowledge that they hold are slowly being forgotten. They [GPS] are very useful tools, there is no question about that, they can take you strait to your destination, even in obscured conditions. With these gadgets you can go straight to your destination (2002).

Alianakuluk's critical view of GPS is not based strictly on cultural reasons but on the well-being of travelers, as he explained in a concrete example of a situation where the use of GPS could have taken him and other people to a dangerous situation:

> One time there was an overdue traveler which became a serious concern to all of us; this was between here and Sanirajak [Hall Beach].There was a real bad blizzard this day. We had met at the Hamlet Chambers to decide on a course of action. So it was at that time it was resolved that we should go out and look at a certain place, hoping that this individual might be in that area. As a result the GPS was programmed to that place; the visibility was poor. So we left with the person with the GPS leading the way. Because of my experience and knowledge, I knew that we were going way too straight to the location marked on the GPS and I also knew that there were a lot of pressure ridges in line with our destination... In addition to this [we were] going to the direction of the floe-edge. Knowing that we were heading for obstacles, I decided that I would try and catch up with the lead with the GPS... I told him that we are going way too much to the southerly direction; I told him that we must make a detour to avoid these obstacles. I told him that I better lead the way and I will lead with Inuk knowledge, otherwise we would get to the rough pressure ridges field. So I led after that, using snow banks created by the prevailing Uangnaq wind

> ... as my wayfinders. We did reach our predetermined destination using my knowledge as an Inuk. Had we just followed the GPS we would have gone through rugged pressure ridges, then even possibly to the floe-edge. This would have caused more problems than help to anyone. That I know for a fact (2002).

Relying on GPS receivers as a main navigational instrument may be already producing some changes in the way people experience their territory. Many hunters mentioned that snowmobile tracks left by GPS users on the snow can be easily recognized because they are straighter than the well-established routes Inuit of the region have been using for generations. GPS users tend to take straighter routes, where they usually face "a difficult time when they reach a real rough landscape, or it might be ice ridges that you would not normally travel on" (Alianakuluk 2002).

It could be argued that such reactions may be produced by nostalgia of older, better times and fear of change that are usually found among the elders of every culture. Inuit in Igloolik, however, are not typical in that sense, as they usually have an open mind and a positive reception to change, especially with regards to new technologies. Alianakuluk himself explained in an interview how receptive people were when such new technologies as the snowmobile or shortwave radios were introduced (2002).

Inuit wayfinding methods are difficult to learn and are in themselves embedded with the local environmental context. Finding the way through snowdrifts involves an understanding of several environmental factors. Even the use of such navigational instruments as the sextant, the magnetic compass or the astrolabe, *requires* a comprehensive understanding of the land and the sky. GPS is a technology of a different nature because in this "geographer's dream" such engagement is optional.

In the context of this work, to say that a GPS user is less engaged with his/her environment than one that uses the winds, etc, is an oversimplification, with which most Inuit hunters in Igloolik would disagree. A GPS waypoint can still represent a significant

place for a traveler involved in the engaging activity of traveling and orienting. However, as the elders implied in their worries, GPS as a technology can provide the conditions for disengagement because it makes available answers to spatial questions whose processing was itself an environmentally engaging experience. This situation is better understood when placing the specific device within the broader context provided by the paradigm. A GPS receiver (just like the electronic coffee grinder) can be the object of meaningful practices, but both are parts of a broader paradigm, in which time is indeed a commodity and where the rhythms of the environment have been replaced by the rhythm of the Gregorian calendar (Campbell 2000: 269). The GPS (and the coffee grinder) provides instantaneous answers that in themselves require no social and environmental engagement. This engagement can be attained but it is not a requirement to perform the task of wayfinding.

Arguably, GPS can help less-experienced travelers to keep up with hunting and other significant long-established local activities with less risk of becoming lost. In the present context, GPS may be, indeed, a useful instrument, but important aspects of the Inuit understanding of the environment may become lost. How important that loss is (how fundamental to the Inuit experience of the environment), is an assessment that we do not dare make. But the particular case of GPS use in Igloolik takes us to a more general reflection on humans' relationship with new technologies.

Such technologies as television, the Internet and central heating have made our lives more comfortable and in many cases more enjoyable. But asking what is being lost when a new technology is introduced is not only pertinent but also urgent in a time of rapid change. Borgmann's theory of the device paradigm is illuminating in that it establishes connections among various technological phenomena, establishing that contemporary technology has become a way (*the* way) of taking up with the world, where engagement with the environment (and with others) may be endangered. To date there have not been systematic attempts to bring Borgmann's theory to anthropological analyses of technology, nor has there been a major connection between the two subfields of anthropology and philosophy of technology. We believe that such interaction can be

mutually enriching and would bring further light to situations that we still understand poorly. In spite of increased attention to technology inside anthropology and in other human sciences, the level of discriminating interpretation and analysis has not kept pace with the rise of technology. Comprehending the consequences of technology, and arriving at salutary approaches to engagement, adaptation and adjustment, are some of the signal challenges facing us.

Conclusion

Identifying the characteristics of the device paradigm, and analyzing it in concrete cases is helpful in that we can reach a better understanding of contemporary technology and change. This also leads to another aspect of Borgmann's theory, one that we have merely introduced here. That is the prescriptive aspect, according to which reform is possible. Can GPS be used without undermining the engagement that the people of Igloolik have with their landscape? We assert one way of achieving this through enlarging the idea of engagement between people and place, and then employing this culturally-situated notion of engagement to ascertain how best to appropriate GPS. Another way of putting this is to propose that a "good" device is one that enlarges the possibility and realization of engagement, and a "bad" one diminishes such a prospect. Obviously, such a stark dichotomy defies the complex context of use of GPS. However, in understanding that a distinctive and widespread pattern—the device paradigm—operates to decompose engagement, and that what is needed against this social corrosion is locally explicit notion of engagement, we are brought closer to asking situated, challenging, and beneficial questions of specific devices as well as of more the more general question of how we are coping with change.

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Chapter 7: Conclusion

During 2001 audiences around the world discovered a film that was very different from those they were accustomed to watch in commercial movie theatres. *Atanarjuat: the fast runner* was filmed in Igloolik, with local Inuit actors and movie makers. *Atanarjuat* is different not only for showing views of a landscape and of a culture remote to most people in the world. The movie also breaks away from the stereotypes about Inuit culture conveyed by most previous documentary and fictional films[35]. *Atanarjuat* is actually based on (and adapted from) an old Igloolik story[36] as told by several contemporary Inuit elders (for a description of the story, see Chapter 2). *Atanarjuat* is a story of love, death, revenge, and jealousy, topics that we find in narratives of the most diverse cultures and languages, from Sophocles and Shakespeare to contemporary oral and written narratives. The Inuit, however, have been frequently portrayed as a people whose lives are completely oriented to surviving. Canadian author, Pierre Berton, for instance, in his attempt to counterbalance a dismissive comment made by 1820's explorer Lyon about some aspects of the lifestyle of Inuit of Igloolik, pointed out that:

> If [the Inuit] discarded pity they also discarded the harsher emotions. Revenge was unknown to them, as was war. They did not quarrel among themselves… They could not afford the luxury of high passion; they needed to husband their feelings in the daily battle with the environment… The Eskimos lived for the day – for any day might be their last (1985: 54).

The idea behind Berton's comment can be found again and again in popular observations and in some ethnographies of Inuit culture. Most journals of Arctic travel or accounts of Arctic adventures are filled with descriptions of extreme circumstances where the main actors fight against the forces of nature (darkness, the cold, strong winds). How is it, the

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[35] For an analysis of how Inuit have been portrayed by movies, see Fienup-Riordan (1995)

question is asked, that the inhabitants of these regions manage to survive in this daily battle against the environment?

One of the main problems with this way of looking at the Arctic and its inhabitants is a lack of understanding of the complex relationships that any people (the Inuit, in this case) develop with the environment where they live. For the Inuit, the dark, the cold, and the winds, are welcomed aspects of everyday life. They are not forces to be fought, but processes that mark the rhythms of yearly activities from hunting to visiting relatives, playing games and telling stories. This view also reflects the tendency in western science to consider nature as separated from (and the antithesis of) culture. Anthropologists such as Basso (1988) and Ingold (2000) have shown that nature and culture are in fact interwoven, a concept that contemporary ethnographies of Northern cultures, such as Nuttall's (1992) and Anderson's (2000) have well demonstrated.

In traveling and orienting, the connection between culture and nature is so intricate that the borderline between the two becomes impossible to draw. One of the main challenges in writing this dissertation was, in fact, that of defining a theoretical object that could include the activities, skills and knowledge that permit Inuit hunters to travel, find their way, and keep their bearings in different environmental conditions. The problem is that some influential theoretical developments have frequently assumed that people move and experience the environment as something external to them, as the concept of "mental map" implies (see Chapter 5).

Across the circumpolar world, native words incorporating ideas of "wayfinding" or "orienteering" do not usually carry the specific meaning commonly attributed to the English term "navigation," which implies the undertaking of a specific spatial task such as going from point A to point B. Indigenous arctic cultures frequently view "navigation", not as the performance of a specific task, but as one of the many knowledge-based skills needed to access successfully and consistently the natural resources of their local territories. Inuit in Igloolik frequently use the Inuktitut term

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[36] Saladin d'Anglure estimates the story to be more than five centuries old (2002: 197)

aangaittuq to refer to someone who is able to travel without losing his/her bearings. The term implies having a "total awareness of one's surroundings", and includes a knowledge of animal movements, a keen sense of weather patterns, an understanding of prevailing snow and ice conditions, and a consciousness of one's precise location within the environment (Aporta and Macdonald, n.d.). This is the reason why a topic such as "Inuit wayfinding" is difficult to isolate as an object of study. Being a good wayfinder is connected to being a good hunter and a good snow-house builder. Wayfinding, traveling and hunting are parts of the broader task of dwelling in an environment that is intimately known and understood.

My goal throughout the different chapters of this dissertation has been to place orienting and the knowledge of the territory within the broader relationship that Inuit hunters establish with their environments when they travel. In the following paragraphs I offer a summary of what, in my view, constitute the most important contributions of this research. These include original research methods, original findings, and new theoretical approaches.

- Part of the methods applied in this project included the use of GPS mapping software and GIS to record place names, trails, and some features of the dynamics of the sea ice. The ease and speed with which place names and trails were mapped and corrected, and the ability of people with little previous experience to undertake this work successfully, demonstrate the viability of the application of this methodology for community-based toponymy projects. As I mentioned in Chapter 1, this method is already being implemented in other communities of Nunavut.

- In chapter 3 I explained how Inuit are able to understand, use, and live in a highly dynamic environment as the sea ice, and how they see their own place in it. Inuit hunters in Igloolik show a unique attitude towards the moving ice that combines respect and confidence to venture onto the ice even when the tide takes it away.

Risk has been reduced to a minimum through an understanding of the processes involved in ice movement, and the patience to wait for the right conditions. From my work on terminology and the interviews presented in Chapter 3, I was able to show that the dynamics of the formation and break-up of the landfast ice has been understood to the extent that a recognizable topography of the sea ice is identified and that names are given to recurrent ice features. I also stressed that the Inuit interaction with the sea ice implies a comprehensive understanding of relationships among different environmental phenomena, and between the environment and humans.

- The characteristics of this relationship between Inuit and their environment were further developed in Chapter 4, concerned with the use and knowledge of trails and routes. I showed the intricate relationships that take place in a lived environment, and that can be clearly seen in the ways Inuit hunters understand and classify tracks, trails and routes. When the snow covers up the land and the sea ice, travelers start breaking trails, some of which recreate routes that have been used by generations of Inuit and that have been shared through oral means. These routes belong to the memoryscape of the community of Igloolik, and their knowledge allows people safe and reliable travel to hunting and fishing grounds and between communities. Remembering community routes is a process through which oral knowledge becomes inscribed on the snow surface through the act of traveling, or by sharing the experience of earlier trips. Breaking and following trails are processes of engagement with the surroundings, as they imply recognition of snow patterns, landmarks, icemarks, and other navigational aids. My research also showed a close connection between place names and routes, and a historic continuity of the oral knowledge related to routes.

- Chapter 5 is a contribution to a better understanding of the Inuit relationship with their environments through an analysis of the activities of traveling and orienting. One of the most important findings of this chapter is the description of how Inuit hunters use specific frames of orientation and how they define spatial location

through the knowledge and descriptions of horizons. A knowledgeable hunter can move and talk about the land, using numerous spatial references in an environment that he sees from the perspective of the traveler: as vistas. Furthermore, I showed that for Inuit in Igloolik the dynamics of the environment and the dynamics of animals and people take place within the stability of fixed spatial frameworks provided by the shores and the winds, and within familiar places and regions. A knowledgeable hunter is engaged in such a way with the environment, that what may appear a homogenous landscape to an outsider is in fact full of spatial references.

- In Chapter 6, Eric Higgs and I inquired into how this relationship between people and their environments has been or can be affected by new contemporary contexts, especially through the use of a new technological device: the GPS. Chapter 6 is a reflection on technology as a theoretical construct as well as on the need to understand technology in context. We offered one of the first analyses of the impact of GPS receivers in people's interaction with their surroundings. This analysis led us to our hypothesis that some technologies may create the conditions to weaken people's engagements with their environments, through a process of converting the human experience of *place* into a more neutral relationship to *space*. We stated that some technologies seem to favour the creation of settings where engagement with the environment is not necessary, but optional. At a theoretical level, we fruitfully combined developments from two sub-disciplines that have not had much interaction before, but that could benefit from each other: philosophy and anthropology of technology.

Potential directions for further research

There are many aspects of this research that could benefit from further development and, in some cases, from inter-regional or even comparative cross-cultural studies. Some of the issues that could be explored include the following:

A comparative study of knowledge and skills about the sea ice. Drawing from my doctoral research in Igloolik, this project could have a comparative inter-regional focus, analyzing knowledge and use of sea ice in other places that differ from Igloolik both in coastal topography and marine conditions. This study could result in a comparative lexicon and a GIS database of place names on the ice, which would reveal regional similarities and differences regarding: 1) vocabulary for sea-ice features and sea-ice dynamics; 2) approach and use of land-fast and moving ice; and 3) characteristics in the naming of recurrent ice features. This project would offer a more comprehensive understanding of how different geographical settings affect environmental knowledge and activities among similar cultural groups.

A comparative, cross-cultural study of people's interaction with dynamic environments. Inuit are not alone in having to interact with highly dynamic environments. All over the world different groups deal with landscapes that change dramatically from season to season or from year to year or even daily. Wind activity changes the topography of the sand in the desert; sharp contrasts between rainy and dry seasons modify the environments in which people live in several parts of the world; and floods change the appearance of the land to extreme degrees in some regions. A study of how different cultural groups interact with highly dynamic landscapes may illuminate some fundamental aspects of the human-environment relation. Some human-related environmental changes such as industrial or urban developments and global warming, could eventually be included in this study.

Inuit women's knowledge and skills as wayfinders. Perhaps one of the most important omissions in studies of Inuit wayfinding has been to consider Inuit women's perspective, knowledge and skills. To date, there has not been a systematic approach to this issue, and only Collignon (1996) has brought up the topic, if only as part of her more general research project. In Igloolik I heard stories about women providing travel directions to snowmobile or dog-sled drivers who were uncertain of their location, and I met a woman who was an able hunter and wayfinder. A study focusing, for instance, on whether

women know the same place names, land marks, orienting aids and spatial frameworks as men, may produce some intriguing findings. It may be necessary to have women researchers for such a project.

Mapping sea-ice use. Although most of the sea ice in Nunavut is used by Inuit,[37] very little is known about the historic patterns of such use. These patterns are difficult for elders to pinpoint and for researchers to illustrate. From an archaeological perspective, the history of sea-ice use is very difficult to establish (Wenzel 1984), and regular paper maps do not reflect the dynamics of the sea-ice topography. New mapping and surveying technologies, including GPS, GIS and satellite imaginary, provide new instruments to document and analyze Inuit use and understanding of the sea ice. Incorporating place names, oral history and ethnographic references related to the sea ice into geographic databases may result in a better knowledge of the historic continuity of the Inuit use of the sea ice.

Geo-referencing communities' land use patterns and history. Mapping land use and other aspects of a place and its inhabitants is not, of course, a novel activity. The mapping of Inuit land and sea-ice use has resulted in some extraordinary products such as the three volumes of the *Inuit land and occupancy project* (Freeman 1976) and the *Nunavut Atlas* (Riewe 1992). Geographic information has been and is being collected in several formats and from several sources, from the 1800s maps drawn by Inuit for explorers (Spink 1972) to the present-day GIS databases of harvesting patterns, sea-ice dynamics, geological formations, global warming and place names across Nunavut. There is an enormous amount of geographic data that would benefit from being geo-referenced and incorporated as different layers of a GIS meta-database that would contain a comprehensive record of a community's history and cultural geography. This database could become a powerful instrument for research and planning. Through the overlying of geographic and historic data into layers, relationships could be established between, for instance, the location of place names and harvesting areas, the use of old and new place

[37] Riewe considers that "virtually the entire landfast ice region in Nunavut is currently utilized" (1991: 5).

names and the location of archaeological sites, temperature changes and sea-ice use patterns, etc.

The effects of GPS in Inuit hunters' experience of the territory. The use of GPS receivers by Inuit hunters was initially the main focus of this dissertation. One of the most important limitations that I faced was that in 1998, when I started the project, GPS was just beginning to be used as a regular wayfinding aid in Igloolik. The use of GPS increased significantly by 2000 and 2001, and it is expectable that it will become more widespread, especially among younger hunters. A study focusing on the effects of GPS in the knowledge and experience of the territory among Inuit hunters could probably be more successfully undertaken in a few years, when younger hunters who have used GPS from their formative years can be consulted.

Place-space. One of the main issues of this dissertation was that of Inuit spatial orienting. I have shown in Chapter 5 that Inuit hunters move among significant places rather than in abstract space, but when and how *space* becomes *place* is an issue that was only marginally treated in this dissertation and that could be the focus of further research. Several authors have already advanced appealing answers as regards the complex relationship between people and landscapes, but the issue has been only marginally addressed in relation to wayfinding and spatial orienting. A related issue, that Higgs and I introduced in Chapter 6, is whether contemporary technology is leading us to treat places as space, somehow inverting the process. This is, indeed, a complex question that would also benefit from further analysis.

Final remarks

Although the Inuit approach to travel and orienting on the land has brought the attention of European observers since the first contacts, several aspects of the knowledge and skills involved in such activities have been only slightly studied by anthropologists and geographers. Topics as important as Inuit astronomy, Inuit knowledge and use of routes

and trails, and Inuit toponymy have been largely overlooked and only slowly are they becoming the focus of research. The importance of understanding and documenting these issues is not only recognized by researchers as a matter of ethnographic interest, but also by Inuit individuals and institutions who are worried that these significant aspects of their cultures may vanish when today's knowledgeable elders pass away. Their worries are not only linked to the issue of cultural loss but also to practical matters related to younger Inuit getting lost or breaking through thin ice while traveling or hunting. The problem is not seen as a matter of *preservation* of traditional knowledge. On the contrary, Inuit qaujimajatuqangit (IQ) is seen as a practical and comprehensive way of undertaking many of the issues that contemporary Inuit communities are facing. The task of applying IQ within the structure of modern life (including formal schooling and public administration) is sometimes more than challenging. During a discussion with one of my main consultants in Igloolik, Theo Ikummaq, about the possibility of teaching Inuit wayfinding methods in schools, he remarked:

> There is no curriculum in the school that can really facilitate traditional knowledge. And traditional knowledge being so extensive, only a portion of it can be discussed in school, because of lack of teaching material in the subject, [and] lack of knowledgeable people making teaching materials. What I find is that we have a shortage of knowledgeable elders. They are overworked, they are too busy. And most times an elder is brought to a classroom for story-telling, which just doesn't justify traditional knowledge. He might give a little concept of this and that; it might give an insight of what life was. But they fail to see that what have worked in the past, still works today and can be used for the future... If for example IQ, Inuit qaujimajatuqangit, that's traditional knowledge as we know it today. If that word comes up, the elders automatically say, "ok, life as it was, life as it is." The youth, the children look at it as "life as it was", qaujimajatuqangit. Not necessarily what we can use today (2000).

Ikummaq's position provides an excellent articulation of a very complex problem. He recognized the value of several efforts to incorporate IQ into formal education, but also pointed out that most programs fail in a very important aspect. IQ is sometimes viewed by teachers, students and even elders as "life as it was." Ikummaq strongly believes that what has been used in the past can be used today and in the future (Ikummaq 2000).

The story of Atanarjuat is an example of how past and present are interwoven in people's relationship with their environment. As I showed in Chapter 2, the events of Atanarjuat unfold in concrete and familiar landscapes and seascapes. Place names are part of the story, as well as ice-features and ice processes. Every year almost everyone in Igloolik travels several times to a summer camp southeast of the island (the old campsite from which the name Iglulik derives). On the way to Iglulik (also known as Iglulik Point) travelers go by a place named Iksivautaujaq ("the two boulders"). Only one of the two rocks is standing now, but people know that Atanarjuat and his brother used to sit on those boulders to scan the sea looking for bowhead whales in the summer.

Figure 7-1: Atanarjuat and his brother used to sit on the two rocks (only one is standing now) known as Iksivautaujaq

Atanarjuat is not a story of the past because there is continuity between the setting of the story and the surroundings where today's Inuit of Igloolik live, hunt, fish and travel. The caribou migrate in similar patterns, the ice freezes in similar ways, even the ice-lead that Atanarjuat jumped across still opens in the same location. Continuity does not mean the existence of an unchanged state of affairs. People as well as their environments change, but, as Ikummaq pointed out, certain important elements of the Inuit knowledge of the environment are as important and useful today as they were before.

The most challenging task still lays ahead: the development and implementation of educational, research and government projects that treat the different aspects of IQ as something of today. In Ikummaq's view, the education of the youth should include formal schooling and time on the land, and should involve written material and the use of

computers, as well as the hands-on experience of traveling and hunting. Topics such as GPS and map-reading should be taught alongside knowledge of the local environment such as prevailing winds, snowdrift-reading, tidal activity, and Inuit astronomy (Ikummaq, 2000). There are several projects being undertaken at different levels to incorporate IQ into education and public administration, but there is still a long way to go. Hopefully this will be a challenge that the different actors of Nunavut (including researchers of several disciplines) will face together through collaboration.

It is my hope that this dissertation will be a small contribution towards a better understanding of the remarkable environmental knowledge (by all means, a science) with which Inuit have traveled and enjoyed a meaningful relationship with their environments both in the past and in the present.

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Appendix 1: Ice topography vocabulary

This table offers a compilation of terms related to topographic features of the ice. Some terms have been included more than once, when different sources added supplementary information. In the column "Meaning", the original text of the interviews (mostly translations of the original texts in Inuktitut) has been respected, except in cases where the wording was confusing. The column "IE#" refers to the filing system used by the Igloolik Oral History Project, from where most of the terms were collected. The other source was John MacDonald's "Snow and Ice—Inuit Terminology" (*Touching North*. Andy Goldsworthy. London: Fabian-Carlsson, 1989).

TERM	MEANING	FEATURE	SOURCE	IE #
AAJURAQ	Open lead or crevice in the spring.	lead	Louis Alianakuluk	477
AGLIURIYUQ	floe edge	moving ice	Noah Piugattuk	54
AKTINNIQ	the open water at the mouth of the river caused from the flow of the river to the sea or a river flowing to another lake.	ice condition / late spring	Emile Imaruittuq	101
AKULLIQ	The one in the middle.	shore crack	Emile Imaruittuq	101
ANGAJUK&IVINIQ	describes the ice that has gone afloat from the floe-edge	ice formation	Pauli Kunnuk	93
ANGILLUQTAQ	occurs in polynyas; a point on the edge of the polynya which is caused as it is situated where the currents are stable	open water	Emile Imaruittuq	101
ATUARUTIT	cracks on the sea-edge ice made by pressure of the tides	crack	John MacDonald	
AUKKARNIQ	a perpetually ice-free area in a frozen sea (a polynya)	open water	John MacDonald	
AULAJJAKTUQ	When the ice starts to move around or looses its mooring to the land.	ice condition / late spring	Pauli Kunnuk	93
AULAJUQ	Moving ice	moving ice	Pauli Kunnuk	93
IIJIKULAAN	little ridges that makes small rough spots	ice ridge	Emile Imaruittuq	101

IILIKULAAT	When a hunter returns and say it was 'IILIKULAAKTUQ', what it means is that the ice was not smooth as there were small pieces of broken ice that stood out as it started to freeze over; thereby the newly formed ice would not be smooth on account of these small lumps of ice which would catch traces as the hunter travelled on this ice in the dog team. So what had happened in the formation of this condition is that the ice might have formed and broken up to pieces and freezes again afterwards, it would not have too much effect on the sled but it catches the traces easier than other ice conditions.	ice ridge	Pauli Kunnuk	93
IJJUKKAQUTAUT	when there is a cake of ice that has ridges on it that may be the only one from the surrounding ice, the rest of the ice formation being smooth.	ice ridge	Emile Imaruittuq	101
IKAARUTIIT	leads that ran from land to land	lead	Emile Imaruittuq	101
ILUVALLIAJUQ	Frost. Describes the sides of the river when it starts to freeze	ice condition / early fall	Pauli Kunnuk	93
IMAQTAVINIIT	See NANGALUQ	moving ice	Pauli Kunnuk	93
IMMAKTINNIQ	puddle of water caused by the melting of the surface snow	ice condition / late spring	Emile Imaruittuq	101
IMMAKTITTUQ	When the snow melts creating water puddles on the ice.	ice condition / late spring	Pauli Kunnuk	93
IMAQQUQ	When the ice starts to melt pools of water will form on the edges of multi-year ice, usually around the beaches where these ice are embedded to the bottom of the water, the tides would move up and down with this ice stable so the movement of the ice around it would decay the edges of this multi-year ice, this condition is known as 'IMMAQQUQ'	ice condition / late spring	Emile Imaruittuq	101
IRIQQAAQ	separation process of the moving ice from the land fast ice.	moving ice	Emile Imaruittuq	101
IRIQQAARUJJAUJUT	Caught when the soft snow (qinnu) starts to surface when the moving ice separates from the land fast ice when it starts to ease from the compact position.	moving ice, action	Emile Imaruittuq	101

IRIQQAAQTUQ	The 'QINNU' (compacted soft snow) will be formed and it will be crushed forming high ridges, it will be so compacted that one can even walk on top of it. When the moving ice starts to divorce itself from the land fast ice (QAATTUQ), this compacted ice will start to surface which had been kept submerged under pressure, this process is called `IRIQQAATTUQ'.	moving ice	Emile Imaruittuq	101
IQPARNIQ	open water that is caused by a crack on the ice due to the currents or the wind.	open water	Emile Imaruittuq	101
ITISIURAQ	When the surface of ice starts to deteriorate where the puddles become deep.	ice condition	Pauli Kunnuk	93
IVUJAUJUQ	sea ice smashed and contorted by the collision of moving ice fields	ice condition	John MacDonald	
IVUNIRAARJJUK	Build up of pressure ridges caused by ice rafting	ice ridge	Louis Alianakuluk	477
IVUIT	generic name for ice ridges	ice ridge	Emile Imaruittuq	101
KAIKKUGALAAT	ice ridges that are shaped in round lumps	ice ridge	Emile Imaruittuq	101
KILAAJUQ	When the ice starts to melt right through the ice usually in the areas where the puddles are deep.	ice condition	Pauli Kunnuk	93
KILLIT	moving fields of ice	moving ice	John MacDonald	
MANIILAGALAAK	small ice ridges that is not an obstacle to travel on	ice formation	Louis Alianakuluk	477
MANIILAGALAAT	Area covered in MANIILAIT (ice ridges caused by movement of ice)	ice ridge	Emile Imaruittuq	101
MANIILAGALAAT	small ice ridges that are not an obstacle to travel on. At the same time one does not enjoy a smooth travel and at times the sled might get to bump into one of them, this is caused of ice break-up when the ice had formed and thickens a bit before it broke up and freezes over again.	ice ridge	Pauli Kunnuk	93
MANIILAIT	Ice ridges caused by freezing. They are caused when the ice that is newly formed starts to pack up on top of each other under pressure, caused by the movement of the ice do to currents or the wind.	ice ridge	Emile Imaruittuq	101
MANIILAIT	ice ridges that it is difficult to travel on. Ice ridges that one has to try and avoid as the sled can easily hit.	ice ridge	Pauli Kunnuk	93

MINNUIIRNIQ	pressure ridges that are caused by the ice moving sideways. These ridges are right on the edge of the land fast ice so in some areas where this is most active one can see the height of the walls of the edge.	moving ice	Emile Imaruittuq	101
NAGGUN (sing.)	leads that run across the ice	lead	Pauli Kunnuk	93
NAGGUTIT (pl.)	generic term for leads. Literal meaning: things that make things split.	lead	Emile Imaruittuq	101
NAGGUTIT (pl.)	leads that run from land to land.	lead	Louis Alianakuluk	477
NAGGUTIT	Generic name for leads	lead	Pauli Kunnuk	93
NAKKAQTUT	The sled breaking through the ice as they travelled. This happens when the ice is no longer freezing. It is also at that time when the `NAGGUTIIT' that had widened that winter will usually decay and the snow covering would be the only visible thing making it soft without ice texture. This applies to all of the cracks that happened in the winter months aside from QUKLUKNIIT.	moving ice, action	Emile Imaruittuq	101
NANGALUQ	When the ice is forming there would be open water areas that had freeze after the surrounding ice. What they use to say is that the surrounding area of the ice may be rough but this particular spot will be smooth as it might have been an open water before it froze over, so it is called NANGALUVINIQ.	moving ice	Pauli Kunnuk	93
NANGALLUIT	The open waters surrounded by ice, usually small open water. This actually refers to an open water that the moving ice did not cover as it is usually a bight.	open water	Emile Imaruittuq	101
NAPAJUNGAQ	broken ice that stands	ice formation	Pauli Kunnuk	93
NAPAKKUTIT	leads that run from land to floe-edge	lead	Louis Alianakuluk	477
NAPAKKUTIT	leads that ran towards the floe-edge	lead	Pauli Kunnuk	93
NIGAJUTAIT	open waters as in a pond created when the ice is freezing but the winds keep these waters open	open water	Emile Imaruittuq	101
NIPITITAAQ	When ice breaks from pressure and freezes over	ice condition	Pauli Kunnuk	93
PINGU	ice hill formed by the expansion of ice bellow the surface	ice formation	John MacDonald	
PIQALUJAVINIIT	Ice floe that had broken off from an iceberg.	ice formation	Pauli Kunnuk	93

PIQUARNIIT	the ridges on the shore that are caused by the rocks at the bottom of the sea. What happens is that in the winter when the tide is down the ice will dent from that rock which will continue to built up as the ice thickens	ice ridge	Emile Imaruittuq	101
PIYUK	to move onto the moving ice from the fast ice at the time of the two had make a contact. The opposite of "tulak."	moving ice, action	Noah Piugattuk	54
PUIMAJUQ	wet, sticky sea ice caused by water bubbling up through the cracks	ice condition	John MacDonald	
PUKTAILA	When the melting of the snow creates a large area of surface water on the ice usually when there are no breathing holes to take in this mass of water.	ice condition / late spring	Emile Imaruittuq	101
QAAJJUJJAUJUT	Hunters caught on the ice when the moving ice divorces itself from the land fast ice.	moving ice, action	Emile Imaruittuq	101
QAATTUQ	when the moving ice moves out of the land fast ice creating open water along the edge, then it is called `QAATTUQ'.).	moving ice	Emile Imaruittuq	101
QAINNGUJUQ / QAINNGUQ	When the shorelines start to freeze	ice condition / early fall	Pauli Kunnuk	93
QALIRIKTINNIIT	when an ice pan breaks off and gets on top of an ice either by current or the wind .	ice ridge	Emile Imaruittuq	101
QANGAJUQ	land fast ice	ice condition	Emile Imaruittuq	101
QINNUAQ	When the sea starts to freeze the primary ice formation on the shores are known as QINNUAQ, this is usually caused by the snow fall that no longer melts and is forming into ice when the winds blow it to the shore lines. So starts the process of ice formation when the snow falls are collected to shore lines blown by the wind.	ice condition	Emile Imaruittuq	101
QINU	it is a built up of snow so one can sink through this condition however it is possible to travel on it.	moving ice	Pauli Kunnuk	93
QINUAQ	Soft or slushy snow in the water.	ice condition	Pauli Kunnuk	93
QINULIMAJUVINIIT	The ice that had been caused by the snow fall when it freeze over	ice ridge	Emile Imaruittuq	101
QUASALIMAJUQ	in the autumn when the ice forms some of the surfaces are smooth so it is slippery, this is the result of the crystal free freeze up so the surface is called. It is snow free so it is slippery.	ice condition / early fall	Emile Imaruittuq	101
QUGLUARNIIT (pl.)	on the moving ice, cracks that may pose some dangers. This crack will start making leads	lead	Emile Imaruittuq	101

QUGLUNGNIIT (pl.)	Built up of ice ridges caused by the movement of ice through the leads.	ice ridge	Emile Imaruittuq	101
QUGLUNGNIQ (sing.)	leads that build up a ridge. So then there are NAGGUTIN that will always run on the same location every year and therefore they usually have built up of pressure ridges.	ice ridge	Pauli Kunnuk	93
QUNGNIIT	generic term for leads or cracks along the shore	shore crack	Emile Imaruittuq	101
QUPPIRNIQ	a strip of ice free area	moving ice	Pauli Kunnuk	93
QUPUTIIT	open water, not very wide, that runs as in a crack which is not confined to a small pond like open water.	open water	Emile Imaruittuq	101
QUVVIQUA	A strip of ice formation on the water which occurs only when the sea is about to freeze. The strip is taken away by the wind	ice condition	Pauli Kunnuk	93
SAAJURAQ	when the warm temperatures dominate over the cold and the moving ice has melted so the waves will destroy the floe-edge carrying pans of ice out when the ice is cracked from the movement of the water. This process is called `SAAJURAQ'.	open water	Emile Imaruittuq	101
SALLIQ	The one further away	shore crack	Emile Imaruittuq	101
SALURAIT	Small patches of ice on this mass of water	ice condition / late spring	Emile Imaruittuq	101
SAMUNGAAQ	When the snow that is next to the ice starts to melt while the surface is still free from dampness.	ice condition / late spring	Pauli Kunnuk	93
SARVA	a perpetually ice-free area in a frozen sea (a polynya)	open water	Alexina Kublu	
SIGLIK	moving ice	moving ice	Louis Alianakuluk	477
SIKU	ice (more or less a generic term)	ice condition	John MacDonald	
SIKUAQ	New ice that forms on the bays as the wind dies out	ice condition	Pauli Kunnuk	93
SIKUAQ	thin ice formation, the first stage of the freeze up	ice condition	Emile Imaruittuq	101
SIKULIAQ	new ice, on which is possible to walk	ice condition	Pauli Kunnuk	93
SIKULIAQ	ice formation that still may be thin but it is now able to carry weight.	ice condition	Emile Imaruittuq	101

SIKUTUQAIT	Ice ridges formed of Multi-year ice. "These are usually carried from the waters from the other side of the land (Committee Bay) where the ice never leaves the area as there is no place for them to go but to float around in the same general area. Source of fresh water.	ice ridge	Emile Imaruittuq	101
SIKUTUQAQ	Multi-year ice. Ice that are around throughout the year, you can see them in the summer time as ice floes, so than when they say that the ice was rough with old ice, that means the multi-year ice.	ice condition	Pauli Kunnuk	93
SINAAQ	floe-edge	ice formation	John MacDonald	
SINGNIQSAQ	Similar to Qinu, but they can be traveled much faster as there is more solidity than the QINU which has nothing solid right through.	moving ice	Pauli Kunnuk	93
SIQUTTIQPALIAJUQ	When the ice starts to break up.	ice condition / late spring	Pauli Kunnuk	93
TIJJATULIQIYUQ	hunting walrus from the solid ice	moving ice, action	Noah Piugattuk	54
TIKPAQ	When all the surface water have run off through cracks and seal breathing holes.	ice condition	Pauli Kunnuk	93
TILLIQPAAQ	or QUNGNIQ. The one that is higher than the rest. It is the first shore crack	shore crack	Emile Imaruittuq	101
TUGGARNIQ	when the land fast ice is cracked under pressure from the moving ice, which usually happens when there is strong southerly winds that will blow the moving ice to the land fast ice. This land fast ice may be an old `UIGGUAQ' but have grown to thickness of that of a land fast ice.	moving ice	Emile Imaruittuq	101
TULAK	referred to the concept of marine travel, meaning to arrive and, the act of touching a solid object i.e. land or ice like on a boat trip arriving and landing on a land or ice. Therefore, the word "tulak" is applicable to marine animals that have prolonged in moving ice and returning to the fast ice.	moving ice, action	Noah Piugattuk	54
TUNGUNIQ	water sky	open water	Louis Alianakuluk	477
TUQQUJATTINIIT	When the ice ridges are formed pointed, which is caused by two ice masses pushing each other	ice ridge	Emile Imaruittuq	101
TUQUJAKTINNIQ	An area on the newly formed ice that is darker than the rest.	ice condition	Pauli Kunnuk	93

TUVANGITTUQ	When the ice leaves.	ice condition / late spring	Pauli Kunnuk	93
TUVAQ	is the ice that formed in the autumn and remained throughout the winter month.	ice condition	Emile Imaruittuq	101
TUVAQ	land fast ice	moving ice	Pauli Kunnuk	93
TUVAVINIIT	Ice floes that had broken of, ice that had formed the preceding winter.	ice formation	Pauli Kunnuk	93
UIGUAQ	When the ice is formed on the floe-edge this is called `UIGUAQ', once this freezes solid it becomes part of that land fast ice, so a new ice would form and this is now a UIGUAQ, while the old one becomes a `UIGUAVINIQ'.	moving ice	Emile Imaruittuq	101
UIGUAQ	new ice formed at the edge of the floe-edge	moving ice	Pauli Kunnuk	93
UIGUAVINIQ	when the new ice (Uigguaq) formed on the floe-edge, becomes older.	moving ice	Emile Imaruittuq	101
UIGUAVINIQ	When Uigguaq gets older and there is build up of ice ridges	moving ice	Pauli Kunnuk	93
UIGUTARNIQ	On the floe edge itself if a small ice forms on the edges, (which is usually about less then few yards wide from the floe-edge)	moving ice	Emile Imaruittuq	101
UKKUAQTINNIQ	is a strip of ice that runs from the moving ice to the edge of the land fast ice, this happens when the moving ice is disconnected to the edge as the tidal currents flow outwards. When the hunters are out on the moving ice they are sometimes taken out on it away from the edge, in most of the cases, hunters will usually get on to the land fast ice on these UKKUAQTINNIIT.	moving ice	Emile Imaruittuq	101
UUKKAQTUQ	when the ice cracks on the land fast ice and the ice pan is carried out or adrift. Most of the hunters had experienced being carried out when it `UUKKAQTUQ', sometimes it will be days for some people to be adrift before they can get back to the land fast ice either by `QAAJUJJAUJUT' or `UUKKARUJJAUJUT'	moving ice	Emile Imaruittuq	101
UUKKARUJJAUJUT (pl.)	Hunters caught on the ice gone adrift from the land fast ice when a crack happens above the floe-edge.	moving ice, action	Emile Imaruittuq	101

Appendix 2: Place names on the sea-ice

The following table provides geographic coordinates for some of the ice features identified with place names by hunters in Igloolik. The coordinates refer only to a particular point of the feature, most of them being ridges, polynyas and leads. Locations related to moving ice features (e.g. *Sikutuqqijuq*) are only relative since they constantly move. The mapping of the features was possible thank to interviews with George Qulaut, Louis Alianakuluk and Maurice Arnatsiaq. Some of the coordinates were obtained using a GPS receiver on location in the spring of 2001. Some of the names and coordinates come from the Igloolik place-names database (see chapter 2).

PLACE NAME	MEANING	FEATURE	LAT	LONG	SOURCE
AGIUPPINIQ	Ice build-up	Ice ridge	69.53564	-81.5562	Louis Alianakuluk
AKULLIQPAAQ	Middlemost	Polynya	69.78826	-82.5303	Database
ANNGIQ	May imply "deep" or "deep part"	Hunting area	69.48818	-81.5651	Database
AUKKARNAARJUK	Little polynya.	Polynya	69.72305	-80.8087	Database
AUKKARNIRJUAQ	The big polynya.	Polynya	69.71887	-82.6104	Database
AULAJUQ	Moving. Refers to a large area.	Moving ice	69.28359	-80.8066	Louis Alianakuluk
AULANIQ	When the ice loses its mooring to the land or landfast ice.	Ice condition	69.34379	-81.38	Maurice Arnatsiaq
IGLULIUP SIKUA	Ice off the coast of Iglulik	Land fast ice	69.3276	-81.4901	Maurice Arnatsiaq
IVUNIRAARJUK	Ice build-up from pressure.	Ice build-up	69.52898	-80.8854	Louis Alianakuluk
IVUNIRAARJURULUK	Ice built-up from pressure.	Ice build-up	69.26536	-81.2067	Louis Alianakuluk
KANGILLIQPAAQ	Closest to the mainland.	Polynya	69.8427	-82.4562	Database
NAGGUTIALUK	The long lead.	Ice lead	69.52133	-81.1239	Louis Alianakuluk
QANGAT	Could be QANNIAQ	Ice ridge	69.7715	-80.6405	George Qulaut
SIKUTUQQIJUQ	Land of the walrus (it refers to a large area)	Hunting area	69.2952	-81.3081	Louis Alianakuluk
TINUJJIVIK	Shallow water.	Coastal ice	69.20734	-81.4021	Louis Alianakuluk
UIGUAQ	Newly formed ice at the floe edge	Ice condition	69.3486	-81.4087	Maurice Arnatsiaq

Appendix 3: Place names survey.

The following table contains place names whose coordinates were obtained with a GPS receiver during the Spring of 2001. This survey of place names was supported by the Igloolik Research Centre, which provided a guide (Maurice Arnatsiaq), language support (Thoretta Iyerak), snowmobiles and gasoline. The survey consisted of mapping and photographing all the place names of Igl'oolik Island and surroundings (we covered the territory included on the topographic map 47 D7, scale 1:50,000). Digital pictures were attached to each name using the GPS mapping software *Fugawi* (see chapter 2). The following list does not include names of ice features (see Appendix 2) and other names that were mapped with the GPS outside the territory covered during the survey.

Name (roman)	Name (syllabic)	Latitude	Longitude
Anarvilik	ᐊᓇᕐᐱᓕᒃ	69.3399821	-81.5574317
Angmanaarjuk	ᐊᖏᓚᓇᕐᔪᒃ	69.4327769	-81.4999183
Anngiq	ᐊᖏᕐᕿᖅ	69.4881796	-81.5651404
Arnaqquaksaat	ᐊᕐᓇᖅᑯᐊᒃᑦᑕ	69.3580543	-81.9056332
Arnaqquaksaat	ᐸᕐᓇᖅᑯᐊᒃᑦᑕ	69.3467977	-81.7775397
Arnaqquaksaat Kangiqlua	ᐊᕐᓇᖅᑯᐊᒃᑦᑕ ᑲᖏᕐᓗᐊ	69.367566	-81.8970606
Avvajja	ᐊᓯᔪᒃᓱ	69.4226407	-81.9840965
Iglulik	ᐃᓚᓗᓕᒃ	69.3418234	-81.4793625
Igluvigaqturliq	ᐃᓚᓗᐱᒡᒐᕐᖢᖅ	69.3806047	-81.506203
Ikpiarjuk	ᐃᒃᐱᐊᖏᔪᒃ	69.3988482	-81.7843619
Iksivautaujaagusiq	ᐃᒃᓯᕐᐅᑕᑐᔪᒋᓯᖢ	69.3422241	-81.5021275
Iksivautaujaq	ᐃᒃᓯᕐᐅᑕᑐᔪᒃ	69.3369206	-81.5227594
Inuksugaruluk	ᐃᓄᒃᓱᒃᓗᓗᒃ	69.4149133	-81.4740183
Iqalulikuluk	ᐃᖅᓚᓕᓂᓗᒃ	69.3900856	-81.6618487
Itivia	ᐃᑎᐃᐊ	69.394979	-81.8549834
Naujaaliruluk	ᓇᐅᔪᓕᕐᓗᒃ	69.36466	-81.485628
Nirlirnaqtuuq	ᓂᕐᓕᖅᑲᖅᑐᖅ	69.48211	-81.6102698
Pikiuliarjuk	ᐱᑭᐅᓕᖏᔪᒃ	69.441724	-81.449146
Qalirusiq	ᖃᓕᕐᓱᖅ	69.3615671	-81.8287685
Qalirusiq	ᖃᓕᕐᓱᖅ	69.3876672	-81.8094078
Qalirusiujaq	ᖃᓕᕐᓱᐅᔪᒃᑐ	69.4147761	-81.8192699
Qikiqtaarjuk	ᖁᑭᖃᑦᔪᒃ	69.4103509	-81.5019458
Qikiqtaarjuup Ataninga	ᖁᑭᖃᑦᔪᑦ ᐊᑕᓂᖅ	69.4013158	-81.5246578
Qikiqtaarjuup Ittivia	ᖁᑭᖃᑦᔪᑦ ᐃᑎᐃᐊ	69.4129235	-81.5353519
Qikiqtaarjuup Kangiqlua	ᖁᑭᖃᑦᔪᑦ ᑲᖏᕐᓗᐊ	69.3965694	-81.5137026
Qimgummigarvigjuaq	ᖁᓐᒍᒪᒥᓕᖅᐃᓚᔪᐊᖅᑐ	69.4389648	-81.9516727
Salliarusiujaq	ᓴᓪᓕᐊᕐᓱᐅᔪᒃᑐ	69.349405	-81.4619484

Sigjariktuq	ᓴᓚᕆᓗᑐᖅ	69.3421519	-81.8642484
Sulluq	ᓴᓪᓗᖅ	69.4193075	-81.9380576
Suluraugaq	ᓴᓗᕐᔪᒃᖅ	69.429541	-81.867282
Tinujjivik	ᑎᓄᒃᑦᐃᒃ	69.3391825	-81.4999807
Ugliarjuk	ᐅᖏᓪᓕᖅᓱᒃ	69.3757578	-81.9948825
UgliarjuupTasia	ᐅᖏᓪᓕᖅᓱᐅᑉ ᑕᓴᐊ	69.3727181	-81.9948344
Ujarasugjualuk	ᐅᔪᕋᓚᐅᓗᒃ	69.3390763	-81.632351
Ullisautilik	ᐅᑉᓕᕆᐅᑎᓕᒃ	69.4229015	-81.752092
Ungaluujat	ᐅᖃᓗᓗᒃᑐ	69.3495021	-81.682114
Uqsuriattiangujaak	ᐅᖅᓴᓚᐊᑎᑎᐊᖃᔨᒪᒃ	69.4854771	-81.7977544
Uqsuutikkuvik	ᐅᖅᓴᑎᒃᑯᐃᒃ	69.3861165	-81.5090172
Utusivik	ᐅᑦᑐᓴᐃᒃ	69.2644451	-81.6833257

Appendix 4: Sea-water features

The following table contains some of the terms used by Igloolik hunters to describe open water conditions. The list is, by no means, exhaustive, and it includes only the terms pointed out by Michel Kupaaq and Antony Qunnun. Their terms can be found in the Igloolik Oral History Database, interviews IE-098 (Kupaaq) and IE-505 (Qunnun).

TERM	MEANING	DESCRIPTION	SOURCE
QIRNIRAARTUQ	Having darker color	When the winds are not strong and there are ripples in the water. According to Qunnun, this indicates that the wind is going to come from the land	Kupaaq, Qunnun
MALLIRTUQ		When the sea gets rough due to wind activity	Kupaaq
QAGGAAQ		White caps riding the waves (under Mallirtuq)	Kupaaq
ANGAJUALLIQ		A wave that is bigger than the rest	Kupaaq, Qunnun
IMULURAATUQ		A small swirling wave on top of the Qagaaq	Kupaaq
INGIULIK		Swell (main body of water)	Kupaaq
TAJJAARARTUQ		Waves hitting the beach	Kupaaq
MAKSULIKTUQ		A condition produced when the tidal current goes against the prevailing wind direction	Kupaaq, Qunnun
MALIKLLUK	Bad waves	Also known as Maksulik	Qunnun
NUVVULAAJUQ		A wave that is created under a Maksuliktuq condition. These waves become pointed in shape	Kupaaq
PIQSIULAARTUQ		This term describes the motion of white caps on the wave. The white caps are carried out by the wind instead of following the wave pattern.	Kupaaq
ISUQTUQ	Turbid water	The water is not clear due to particles such as mud or other dirt	Kupaaq
IRRINGNANGITTUQ	Turbid water	Water that is not clear during the early stages of the break-up of the ice. This condition is produced when fresh water flows to the salt water from the melting ice. The fresh water will float over the heavier salt water, which results in this turbid condition. Once the fresh water had sank to the heavy or salt water and mixes, the water will clear again.	Kupaaq
MALLIQ	Rough sea		Qunnun

Appendix 5: Spatial, traveling, and directional terms

The following table contains terms that convey some kind of directional information, or that refer to environmental features or activities that have importance in terms of orienting and traveling. The categories are not strict, and the list is not exhaustive. The table provides, however, a good idea of the complexity of the Inuit approach to the territory. The main sources for this list were interviews (all of them part of the Igloolik Oral History Project). This lexicon was considerably improved through comments from John MacDonald and Maurice Arnatsiaq. Some terms gathered from older interviews were occasionally difficult to place in context, and their meanings remain unclear. I chose to keep them on the table since they may be of value in future research.

TERM	MEANING	FURTHER COMMENTS	INTER VIEW	SOURCE
		GENERAL SPATIAL TERMS		
ATAARTUT	Littoral	Going down to the littoral from the mainland	IE-269	Zachariasie Uqalik Aqiaruq
ILUILIQ	A large mass of land	A body of land without any islands	IE-269	Zachariasie Uqalik Aqiaruq
NUNAVIK	It refers to the interior of the mainland (away from the littoral).	It refers to the interior of the mainland where you don't see the sea	IE-272	Michel Kupaaq
SINGMIUJUQ	People residing in the littoral	The term refers to people that stayed in the littoral hunting marine mammals while the others went inland hunting caribou.	IE-269	Zachariasie Uqalik Aqiaruq
		DIRECTIONS		
KIVA	Where there appears to be nothing	When one looks at the land "and beyond that in the distance there appears to be nothing"	IE-269	Zachariasie Uqalik Aqiaruq
KIVALLITTUQ	The sky is obscure in the direction of the southwest horizon	This expression is a warning that bad weather is imminent	IE-272	Michel Kupaaq
KIVAVAQ	Heading towards the direction of the day	Expression used to refer to traveling to Naujan	IE-269	Zachariasie Uqalik Aqiaruq

PANGNA	Direction of the day.	This term is used when referring to a place towards the general direction of north. The speaker is situated in the mainland (e.g. Melville Peninsula)	IE-269	Zachariasie Uqalik Aqiaruq
PINGNA	That one up there	This term is used when referring to a place towards the general direction of north. The speaker is situated on an island	IE-269	Zachariasie Uqalik Aqiaruq
TAUKA	Down there	The land of the white people (southern Canada)	IE-272	Michel Kupaaq
TAUNANI	Referring to places down there	south?	IE-269	Zachariasie Uqalik Aqiaruq
TAUNUNGAUJUQ	Going down	Going south	IE-269	Zachariasie Uqalik Aqiaruq
UKSUMINGA	The one down there	It refers to the floe edge, from Igloolik	IE-272	Michel Kupaaq
UNGNA	Down there (refers to Arctic Bay area). Darkness.	Refers to Arctic Bay area from Igloolik, and to Igloolik from Naujan	IE-269	Zachariasie Uqalik Aqiaruq
UNGNA	Down there	Any direction towards water	IE-272	Michel Kupaaq
UQURMMIUT	People living on the lee side	Refers to people residing in "places like KANGIRSUGAAPIK, these were the people that were referred to as QURMMIUT which covers the vicinity of MITTIMATALIK area across the mainland of KANGIRSIMAJUQ"	IE-269	Zachariasie Uqalik Aqiaruq
RELATIVE LOCATION				
SALLIARUSIQ	The one further down	The further of a series of mountainous ranges	IE-272	Michel Kupaaq
TILLIQ	Higher	The closer of a series of mountainous ranges	IE-272	Michel Kupaaq
TRAVELERS				
ITIJJAAQ	Coming from Pond Inlet / Arctic Bay		IE-314	Hubert Amarualik
ITIVITTUQ	Traveling to Arctic Bay / Pond Inlet		IE-314	Hubert Amarualik
KIVAVVAAT	Traveling to the Naujan area		IE-314	Hubert Amarualik
PIJUAQ	Returning to the Igloolik area from the Naujan area		IE-269	Zachariasie Uqalik Aqiaruq
PIJUARAALUIT	Travelers coming from the Naujan area		IE-314	Hubert Amarualik
WEATHER				

ANIJAAQ	Going out immediately after dressing up in the morning to observe the sky (clouds, wind and stars)	Elders remember to be asked every morning to go outside and report on weather conditions	IE-314	Hubert Amarualik
		WIND DIRECTIONS		
AKINNAQ	SSW wind		IE-273	George Kappianaq
AQURRUTINGAJUQ	In between	Wind blowing between Akinnaq and Uangnaq.	IE-273	George Kappianaq
KANANGNAQ	NNE wind		IE-273	George Kappianaq
NIGIQ	ESE wind	Nigiq is a male wind. It blows constantly, sometimes for several days at a regular speed.	IE-273	George Kappianaq
UANGNAQ	WNW wind	Uangnaq is a female wind. It is characterized by abrupt speed changes.	IE-273	George Kappianaq
		WIND BEARINGS		
AKINNAQ	Right	The subject is facing away from Uangnaq	IE-505	Antony Qunnun
KANANGNAQ	Left	The subject is facing away from Uangnaq	IE-505	Antony Qunnun
PAANGAJAAQ	Up there	Indicates the direction of Uangnaq (when you are facing away from Uangnaq)	IE-505	Antony Qunnun
UNANGATJAAQ	Down there	Indicates ESE (Nigiq) when you are facing away from Uangnaq	IE-505	Antony Qunnun
		TRAVEL TERMS		
AULAANGULLUNIGUUQ	It is said that this traveller was with the family		IE-505	Antony Qunnun
AULLAAQ	He is gone to a long distance place with this family	The traveler would be carrying all his gear for a long-distance trip.	IE-505	Antony Qunnun
AULLAARTTUQ	Taking the family along when traveling		IE-505	Antony Qunnun
NULIAGIRTTUQ	Taking along a wife when traveling		IE-505	Antony Qunnun
QIMUKSIUQATIGIIT	Dog team, in each other's company	More than one dog team involved in the journey	IE-505	Antony Qunnun
TUKTULIARTTUT	Gone caribou hunting (without his family)	For those that are gone to long distances places, they are identified for whatever takes them to a long distance journey. Another example is NATTIARASUGIAQTTUT (gone hunting seals)	IE-505	Antony Qunnun

UTIRJARIAQ	A traveler that goes and is due to return in the same trip		IE-505	Antony Qunnun
		SPEED		
PIANGNANGITTUQ	Slow traveling due to snow conditions		IE-505	Antony Qunnun
		BACK / FORTH		
KANGIVAQ	Return journey from boating at the open sea	Kangivaq implies heading back to a safe place, or homeward bound. It derives from the term Kangiq (the ventilation hole of an igloo). If you are at the entrance and walked towards Kangiq you are also going Kangivaq. The tip towards the entrance of a qulliq (lamp) is also called Kangiq.	IE-505	Antony Qunnun
MAUTTUT	Heading away from the landfast ice to the moving ice	Sammuk and Mauttut refer to the same spatial action of going out from the safe place of the beach or landfast ice	IE-505	Antony Qunnun
SAMMUK	Gone out boating to the open sea		IE-505	Antony Qunnun
TUVVIAQTTUQ	Heading to the landfast ice from the moving ice	Use when people are going back from hunting walrus on the moving ice	IE-505	Antony Qunnun
		SKILLS AT WAYFINDING		
AANGAITTUQ	Attentive	Qunnun: If this person is given instruction then he knows where to go without difficulty. Qamaniq: "One who is real observant, and knows what he can use to get his bearing, this person will appear to be AANGAITTUQ, as he knows where his destination is at, no matter what location he may be, this is known as AANGAITTUQ".	IE-505, IE-496	Antony Qunnun, Nathan Qamaniq
AANGAJUQ	Non alert	Qunnun: "He didn't find the object he was looking for". Both aangaittuq and aangajuq are applicable to dogs. Qamaniq: "One who moves away from the community, he immediately looses where his destination is at, so as a result he will travel blindly".	IE-505, IE-496	Antony Qunnun, Nathan Qamaniq
		LONG JOURNEYS		
PAGIJJIJUT	People left behind when the hunter was away in a long trip		IE 506	Louis Alianakuluk
QANIJIJUQ	Taking load ahead	When long journeys were undertaken, loads of dog food were laid out in advance	IE 506	Louis Alianakuluk

QANIUQAQ	Leading	In preparation to long journeys they would go back and forth to a specific location caching their load	IE 506	Louis Alianakuluk
		RIGHT /LEFT		
SAUMILIAJATTUQ	Tend to move to the left	A dog team or a boat	IE-505	Antony Qunnun
TALIRPILIAJATTUQ	Tend to move to the right	A dog team or a boat	IE-505	Antony Qunnun
		SPIRITUAL JOURNEY		
IKIARQIJUT	Spiritual journey	A shaman's journey to check for the well-being of neighbouring camps	IE 506	Louis Alianakuluk
		SNOW DRIFTS		
QIMUKJUIT	Snow drifts	Usually formed on the lee way of a boulder or rocks and ice floes	IE 098	Zachariasie Uqalik Aqiaruq
SIVINGAJUQ	Sloped	Snow built up on the lee way of a hill	IE 098	Zachariasie Uqalik Aqiaruq
TISSUJAAQ	Snow drift	Snow built up on the lee side of an ice floe	IE 098	Zachariasie Uqalik Aqiaruq
TULLIMAJUQ	Snow surface	Uqalurait been smoothed-up by a Kanangnaq wind	IE 098	Zachariasie Uqalik Aqiaruq
UANGNIUTIT	Snow drifts	Drifts created by the NW wind	IE 481	Louis Alianakuluk
ULUANGNAQ	Like a cheek	Snowdrifts created by the Nigiq wind		
UQALURAQ	Like a tongue	Snowdrifts formed by the Uangnaq wind	IE-314	Hubert Amarualik
		ANIMALS (DIRECTIONAL)		
ANIMMIRSAQ	Floating	Marine animals floating on the direction of the tidal currents	IE 469	Abraham Ulaajuruluk
		ICE (DIRECTIONAL)		
PIQUARNIIT	Ice piling up from below through the year	This ice is not multi-year ice. It is produced by the currents along a flat shore. These ice formations are used for direction finding around the island Nirlirnaqtuuq.	IE 481	Louis Alianakuluk
		TRAILS AND TRACKS		
AQUTI	A route	Aqutiit are routes (or spatial courses) that exist abstractly in the memory of people. Aqutiit become physical features of the landscape when people break the trails, leaving their tracks on the snow.		Maurice Arnatsiaq
IGLINIKULUK	A small trail	An iglinikuluk is formed by a few tracks. It is not (but it could become) a well-traveled trail, or igliniq	IE 481	Louis Alianakuluk
IGLINIQ	A trail made of tracks left by sleds or snowmobiles	Igliniq refers to a trail that has been adopted by the community, is made of several tracks and is routinely used for travel	IE 481	Louis Alianakuluk

QIRSUNGANGITUT	Soft, new tracks		IE 098	Zachariasie Uqalik Aqiaruq
QIRSURSIMAJUT	Hard, old tracks		IE 098	Zachariasie Uqalik Aqiaruq
TULLINIQ	A well-established path made by humans or animals walking			Maurice Arnatsiaq